REQUEST FOR PROPOSALS

SEPTIC SYSTEM DESIGN SERVICES

BAY MILLS INDIAN COMMUNITY
CHIPPEWA COUNTY, MICHIGAN

September 2023

I. **Introduction:** The Bay Mills Indian Community (BMIC) is soliciting proposals for design services for residential septic systems for Tribal members. Work will take place on the Bay Mills Indian Reservation and surrounding areas in Chippewa County, MI.

II. **Project Administration:** The BMIC is the owner for this project. The selected firm will contract directly with the BMIC for the services to be rendered.

   Proposals are due by **Thursday, October 5, 2023** and can be submitted via mail or e-mail to the following address:

   Rachel Lyons, Tribal Manager  
   Bay Mills Indian Community  
   12140 Lakeshore Dr.  
   Brimley, MI 49715  
   rlyons@baymills.org

III. **Schedule:** A contract award will be made as soon as possible after the receipt of bids. Work requests will be forwarded by the BMIC to the consultant as sites are identified. Upon receipt of a work request, the consultant shall complete the soil testing, design and bid package preparation within 1 month. The contract will remain open for 1 year from the effective date of the contract.

IV. **Scope of Services:** Septic system design services may be required for both newly constructed homes and existing homes with failed or deficient septic systems.

   **Information to be provided to consultant with work order:** The work order will include a completed site evaluation form prepared by the Indian Health Service. The site evaluation form will include the site address and contact information, site photos and a description of deficiencies for existing failed systems.

   **Soil Testing:** The BMIC Public Works Department will provide equipment and personnel to excavate test pits as necessary for the consultant to complete soil testing. Coordinate the schedule with the Public Works Department and the homeowner a minimum of 1 week in advance of the proposed work date to allow BMIC Public Works to arrange for utility
locates. Provide the services of a qualified soils tester to observe and evaluate the soils in a minimum of 2 locations within the proposed drainfield or mound area. Prepare a soils evaluation report similar to those shown in the attached examples. Record test pit location information relative to house corners, property boundaries or other property features.

**Design:** Prepare and submit septic system design documentation including all appropriate calculations and assumptions. Incorporate any specific site layout requests from the BMIC or homeowner into the system design.

For “off reservation” homes, prepare designs in accordance with Chippewa County Health Department Requirements.

For “on reservation” homes, although the Chippewa County Health Department does not have jurisdiction on the reservation, the consultant shall prepare system designs in accordance with the attached “Technical Guidance Manual”.

Design documentation shall be similar to what is shown in the attached examples.

**Site Plan:** Prepare a detailed and scaled site plan showing the test pit locations and the location and size of the proposed septic system components relative to property boundaries, structures, wells, driveways and other significant property features.

Site plan shall be similar to what is shown in the attached examples.

**Bidding Documents:** Prepare a bidding documents package including a general description of the work and technical specifications to describe the products and materials as well as installation instructions for the proposed septic system. Bid package shall include the appropriate system design information and the site plan.

V. **Method of Measurement and Basis for Payment:**

1. **Soil Testing**
   a. Unit of Measurement: Each
   a. Basis of Payment: Includes coordination with the Bay Mills Public Works Department for digging of test pits, coordinating with homeowner for site access, mobilization of a qualified soils tester to the site, observing and recording soils data in a minimum of 2 test pits and submitting a completed soils evaluation form.

2. **Design, Site Plan, Bidding Documents**
   a. Unit of Measurement: Each
   b. Basis of Payment: Includes preparing a complete septic system design in accordance
with Chippewa County Health Department requirements, preparing a detailed site plan and preparing a complete set of bidding documents.

VI. Other Stipulations:

1. This project is funded by the Indian Health Service. Refer to the attached Section 01300 – Administrative Requirements for funding agency requirements related to this solicitation.

Attachments:

1) Bid Schedule
2) Section 01300 – Administrative Requirements
3) Chippewa County Health Department Technical Guidance Manual
4) Example Soil Evaluation Report
5) Example Septic System Design and Site Plan
6) Example Bidding Documents
ATTACHMENT #1

BID SCHEDULE
## BID SCHEDULE

Bay Mills Indian Community  
Septic System Design  

Schedule A  

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Est Qty</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Soil Testing</td>
<td>5</td>
<td>Each</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Design, Site Plan, Bidding Documents - Mound System</td>
<td>3</td>
<td>Each</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Design, Site Plan, Bidding Documents - Standard System</td>
<td>2</td>
<td>Each</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Project:  

Signature of Offeror  

Date  

Position and Company  

---  

**NOTE TO OFFERORS:**  
The quantities in the bid schedule are approximate. The unit prices will be used to award work as the need arises. Additional work beyond the quantities on the bid schedule may be awarded via change order if necessary.
ATTACHMENT #2

Funding Agency Administrative Requirements
SECTION 01300
ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the administrative notes and requirements for this contract.

1.02 For all contracts:

A. The Indian Health Service (IHS) is the engineer for this project; however, this is not a federal contract. IHS reserves the right to inspect the work performed by the Contractor or any of its Subcontractors. IHS does not represent the Tribe and the Tribe does not represent IHS regarding any matter related to administration of this Contract.

B. Indian Preference

1. IHS Indian preference requirements apply to the solicitation and award of this contract. Indian Preference will be used in selecting the contractor for this Work. If Bidder is eligible for Indian preference, documentation of tribal affiliation and ownership of the bidding enterprise must be provided with Bid.

Contractor agrees that, to the greatest extent feasible, preferences and opportunities for training and employment in connection with this Agreement shall be given to Indians; and, as reasonable, preference in the award of any subcontracts in connection with this Agreement shall be given to Indian organizations and to Indian-owned economic enterprises as defined in Section 3 of the Indian Financing Act of 1974 (88 Stat. 77).

C. Suspension and Termination of Work

1. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any change proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

2. If the Contractor fails to perform the work in accordance with the Contract Documents, Owner may declare the Contractor to be in default and give Contractor notice that the Contract is terminated. The termination will not
affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor.

3. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for completed and acceptable work executed in accordance with the Contract Documents prior to the effective date of termination. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.


E. Debarment and Suspension (Executive Orders 12549 and 12689)—A contract award (see 2 CFR 180.220) must not be made to parties listed on the government-wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR part 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

F. Contractor is required to perform thirty-three and one-third percent of the total amount of the Work using its own employees and equipment. Copies of subcontract agreements may be requested to verify the amount of Work performed.

G. Contractor is hereby notified that state lien laws do not apply on Federal trust land.

H. Dispute Resolution: This agreement shall be construed in accordance with and governed by the laws of the Tribe. In the absence of Tribal law on point, Federal law shall apply and, in the absence of Federal law, the laws of the State of Wisconsin shall govern.

1.03 For Contracts Exceeding $2,000:

A. The Contractor shall comply with wage and provisions of the Davis-Bacon Act (40 U.S.C. 3141-3148) as supplemented by Department of Labor regulations (29 CFR part 5). In accordance with the statute, Contractors must be required
to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor.

B. The Contractor shall comply with the Copeland “Anti-Kickback” Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR part 3). The Act provides that each Contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled.

1.04 For Contracts Exceeding $10,000:

A. Contractor shall comply with the requirements of 41 CFR 60-4 regarding required notices and procedures to be followed in soliciting for federally assisted construction contracts (including subcontracts). Compliance with Executive Order 11246 and 41 CFR part 60-4 shall be based on implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4.3(a) and efforts to meet the goals established for the geographical area where the Contract is to be performed.

1.05 For Contracts Exceeding $100,000:

A. The Contractor shall comply with the provisions of the Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Under 40 U.S.C. 3702 of the Act, each Contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous.

B. The Contractor shall comply with the provisions of the Byrd Anti-Lobbying Amendment (31 U.S.C. 1352), certifying that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award.

END OF SECTION
ATTACHMENT #3

Chippewa County Technical Guidance Manual
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>DEFINITIONS</td>
<td>3</td>
</tr>
<tr>
<td>SEWAGE SYSTEM INSTALLER LICENSING PROCEDURES</td>
<td>3</td>
</tr>
<tr>
<td>TEST HOLES</td>
<td>4</td>
</tr>
<tr>
<td>SEWAGE SYSTEM ABANDONMENT</td>
<td>4</td>
</tr>
<tr>
<td>AGGREGATE/FILTER MATERIAL</td>
<td>5</td>
</tr>
<tr>
<td>SEPTIC TANKS</td>
<td>5</td>
</tr>
<tr>
<td>PUMPS AND PUMP TANKS</td>
<td>6</td>
</tr>
<tr>
<td>EFFLUENT FILTERS</td>
<td>7</td>
</tr>
<tr>
<td>SEPTIC AND PUMP TANK INSPECTION PORTS, RISERS, LIDS, SAFETY DEVICES</td>
<td>7</td>
</tr>
<tr>
<td>ALTERNATIVE OSTDS</td>
<td></td>
</tr>
<tr>
<td>CHAMBERS AND EZFLOW</td>
<td>8</td>
</tr>
<tr>
<td>PUMP AND HAUL</td>
<td>8</td>
</tr>
<tr>
<td>VAULT PRIVY AND OUTHOUSE BUILDING</td>
<td>9</td>
</tr>
<tr>
<td>ELEVATED MOUND</td>
<td>10</td>
</tr>
<tr>
<td>PRESSURE DOSED MOUND</td>
<td>11</td>
</tr>
<tr>
<td>ADVANCED TREATMENT UNITS</td>
<td>12</td>
</tr>
<tr>
<td>WASTEWATER TREATMENT PONDS (LAGOONS)</td>
<td>13</td>
</tr>
<tr>
<td>EVALUATION OF EXISTING OSTDS</td>
<td>16</td>
</tr>
</tbody>
</table>
INTRODUCTION

The Upper Peninsula Environmental Health Code was adopted to promote public health, safety, and welfare of the people of the Upper Peninsula of Michigan. Within the Code are the specifications for construction of sewage and water supply systems. Due to the dynamic and complex nature of on-site sewage and water systems governed by the Code, an on-going technical guidance document is necessary. This Technical Guidance Manual has been prepared to provide guidelines, specifications, and standard practices used to implement the Code.

DEFINITIONS

Department- The Chippewa County Health Department.

Health Officer- The administrative officer appointed by the local governing board who is responsible for the operations of the Department and the administration and enforcement of Michigan’s Public Health Code, Act 368, P.A. 1978 as amended (Mich. Comp. Laws Ch. 333) and associated statutes within the legal jurisdiction of the Department. Health Officer also includes any employee or designee of the Department acting under the direction of the Health Officer during their normal course of duties.

OSTDS- An On-Site Treatment and Disposal System having the primary design that incorporates a septic tank and an absorption system, or a privy.


SEWAGE SYSTEM INSTALLER LICENSING PROCEDURES

1. Applicants will fill out the proper application for licensing and pay the appropriate fee.
2. First time and previously licensed but expired applicants shall complete a written exam provided by an Environmental Health representative of the Department.
3. Upon satisfactory completion of the exam, the results will be reviewed and incorrect answers discussed with the applicant.
4. A minimum score of 80% correct answers is required for licensure.
5. Licenses are valid for three years, from April 1 of 2019, until March 31, 2022. The three-year cycle continues, beginning April 1 of 2022 until March 31, 2024, continuing for each successive three-year licensing period.
6. A septic system installer license will be provided to the successful applicant.
7. Additional testing could be required of all licensed installers as requested by the Department.
8. A list of all licensed installers will be kept by the Department.
TEST HOLES

Purpose: A test hole is required to be provided by the property owner for the initial evaluation to allow for Environmental Health staff to conduct a thorough and logical assessment of native soils in the location of the proposed on-site treatment and disposal system. Usually, the test hole is dug by a machine-driven excavator.

1. The following are guidelines as to what is expected by the property owner and acceptable for alternatives to machine driven excavations:
   a. A test hole must be a minimum of 6 feet in depth with surface dimensions of two feet by four feet (2’ x 4’).
   b. The test hole may be hand dug.
   c. If the test hole is excavated prior to Environmental Health staff arriving on site, it must be covered to prevent an on-site safety hazard.

For some remote sites where it is difficult to maneuver excavators in the area, Environmental Health staff may conduct manual auger digging. This will be done on a case-by-case basis, and only upon prior approval by the Department.

SEWAGE SYSTEM ABANDONMENT

Septic Tank Abandonment

Abandonment shall not proceed until the septic tank is pumped and the contents properly disposed of by a licensed septage waste hauler. Alternative methods of septage and tank disposal may be approved in writing by the Health Officer. Proper abandonment of a septic tank shall consist of one of the following methods:

1. Collapse tank and fill area when feasible, otherwise completely fill it with material approved by the Department. Provide compaction during the filling process to eliminate the potential to develop a sinkhole or any other safety hazard.
2. Remove and haul the tank to a licensed Type II landfill. Containment of the components is required, with particular attention paid to over-the-roadway hauling, so as to avoid exposing the public to a health hazard.
3. A property owner may choose to bury the abandoned septic tank on their own premises, or the premises of another with that owner’s permission. All components of the system shall be buried in a manner that does not create an environmental health hazard. All isolation distances for the buried components must meet the minimum requirements for isolation distances for absorption systems as detailed in the Upper Peninsula Environmental Health Code, Table 3-14.2 A.

Absorption System (Drainfield) Abandonment

When it is practical to do so, the absorption system should be left in place. When the area is needed for other purposes, the absorption system may be removed. The disposal method to be used shall be one of the following:
1. Remove and haul the contaminated material to a licensed Type II landfill. Containment of the contaminated material is required, with particular attention paid to over-the-roadway hauling, so as to avoid exposing the public to a health hazard.

2. A property owner may choose to bury the abandoned absorption system on their own premises, or the premises of another with that owner’s permission. All components of the system shall be buried in a manner that does not create an environmental health hazard. All isolation distances for the buried components must meet the minimum requirements for isolation distances for absorption systems as detailed in the Upper Peninsula Environmental Health Code, Table 3-14.2 A.

AGGREGATE/FILTER MATERIAL

1. Aggregate shall be washed stone or other material approved by the Health Officer that complies with all of the following specifications:
   a. One hundred percent (100%) passing through a two and one-half inch (2 ½”) sieve.
   b. No material shall pass a three-eighths inch (3/8”) sieve except for fines. Fines are material that will pass through a number two hundred (200) sieve.
   c. The total fines content passing through a number two hundred (200) sieve, as determined by a loss by wash method, shall not exceed one-half percent (0.5%).

2. Stone aggregate may be field evaluated for hardness acceptability (greater than 3 on Mohs hardness scale) by determining whether it can scratch a copper penny without leaving any rock residue.

3. Aggregate shall be transported, stockpiled, and/or otherwise manipulated in a manner which will not contaminate it with fines exceeding one-half percent (0.5%) loss by wash method.

4. Slag, chipped rubber, synthetics, concrete pavement, and other alternative aggregate may be approved in writing by the Health Officer.

5. Glass shall not be approved as an aggregate.

6. Filter fabric is required on all septic field types. Hay and straw are also approved. Other materials may be approved by the Health Officer.

SEPTIC TANKS

1. All septic tanks shall be constructed of concrete unless otherwise approved. Plastic septic tanks should not be permitted in clay or high-water table sites.

2. In order to provide technical guidance to meet this standard, the following specifications have been established:
   a. Pre-cast concrete tanks shall have a minimum wall, compartment, and bottom thickness of two-and-one-half inches (2 ½”) and shall be adequately reinforced. The top shall be at least four inches (4”) thick and able to withstand the load for which it was intended.
   b. When a concrete block tank is permitted by the Health Officer, it shall be constructed of concrete block with a minimum thickness of eight inches (8”), laid on a four-inch (4”) minimum poured concrete foundation. All block joints shall
be adequately mortared. All block holes or cells shall be filled with mortar or concrete. The tank shall be made watertight by application of a waterproof sealant.

c. A cast-in-place concrete tank shall be approved by the Health Officer prior to construction and comply with all specification listed in part a.

3. The liquid capacity of all prefabricated septic tanks shall be permanently marked on the uppermost tank surface.

4. Manufacturers shall demonstrate, upon request of the Health Officer, that the septic tanks that they manufacture are watertight.

5. Multiple compartment tanks shall comply with the following:
   a. As measured from the invert elevation of the outlet, the first compartment shall have at least two-thirds (2/3) of the total required liquid capacity.

---

**Figure 1:** Septic tank, pump tank, and pump construction.

---

**PUMPS AND PUMP TANKS**

1. All materials shall be durable, corrosion resistant, and designed for their intended use.

2. The Licensing and Regulatory Affairs of Michigan (LARA) Electrical Division, should approve all electrical components.

3. Electrical components must be installed under electrical permit.

4. The pipe from the septic tank to the pump tank must be four-inch (4”) diameter schedule 40 PVC.

5. The pump tank shall be at least 200-gallon capacity and intended to be used in sewage applications, or otherwise be approved by the Department.

6. The pump tank shall be concrete unless otherwise approved by the Department.

7. The pump must be an effluent or grinder pump as required in the permit, and intended for pumping sewage.

8. Commercial pumps and alarms must be wired by a licensed electrician. Residential electrical work may be done by the homeowner.

9. A minimum of a visual alarm is required to be installed in a conspicuous location. Both an audio and visual alarm are recommended.
10. The effluent line leaving the pump tank must be one-and-one-half inch (1½”) to two-inch (2”) schedule 40 PVC or one-and-one-quarter inch (1¼”) to 2-inch (2”) black plastic water line.
11. An accessible pump disconnect fitting is required.
12. A weep hole is required.

**EFFLUENT FILTERS**

1. An effluent filter is required in all new and/or replacement septic system installations. This will at times require effluent filters to be retrofitted to existing tanks.
2. The filter shall be installed and used in accordance with the manufacturer’s recommendations.
3. An effluent filter shall meet the following specifications:
   a. Be constructed of durable and corrosion-resistant materials.
   b. Be designed to prevent the escape of suspended solids during normal operation or malfunction.
   c. Retain all particles greater than one-eighth inch (1/8”) in size.
   d. Be designed to accommodate the effluent discharge, in gallons per day, for the system it serves.

**SEPTIC AND PUMP TANK INSPECTION PORTS, RISERS, LIDS, SAFETY DEVICES**

**Inspection Ports**

Septic tanks and pump tanks shall contain at least one port, of at least 15 inches in diameter, to serve as an access point for baffle and effluent filter maintenance, access to the pump, and to allow for easy access for pumping the tank.

**Risers and Lids**

When a new or replacement on-site sewage treatment and disposal system permit is issued, it shall be required to install a riser on the outlet tank inspection port for both existing and new septic tanks. A riser is not needed if the lid of the tank is at grade.

The construction of the riser and lid for all septic tank and pump tank installations shall meet the following minimum requirements:

1. The riser and lid shall be corrosion-resistant, durable, and of watertight construction.
2. There must be a watertight connection between the riser and the tank.
3. The lid shall be installed to grade.
4. The lid shall have acceptable protection to prevent unauthorized access, such as a twist lock or other device requiring a tool for removal, a weight of 60 pounds, or a similar tamper resistant, childproof-type device approved by the Department.
5. If screws are used to secure the lid, stainless steel screws are required.
6. The riser and cover shall be NSF standard 5 approved or equivalent and shall be approved under the authority of the Health Officer prior to permitting and installation.

Safety Devices

1. If a septic tank’s original concrete lid cannot be left in place, a secondary safety device shall be installed to preclude accidental tank entry.

2. A safety device shall be installed in a pump tank, if a hazard can occur.

ALTERNATIVE OSTDS

Chamber and EZFlow® Systems

1. Chamber and EZflow® systems may be permitted by the Department in conventional OSTDS applications only.
2. The Department must size these systems according to the manufacturer’s specifications for the make and model of chamber or system proposed.
3. For chambers, provide a minimum of 12 inches of sand between rows in absorption beds.
4. For a trenched system, chambers and EZflow® bundles must be installed six feet (6’) apart on center, with a minimum of three feet (3’) of undisturbed soil between trenches.
5. Chambers and EZflow® bundles must be covered with filter fabric.
6. Cover chambers and EZflow® bundles with 12 to 24 inches of approved cover.
7. Runs should not be more than 50 feet long.

Pump and Haul

See section 3-10, D, 1-5, of the Code for situations in which pump and haul may be permitted.

1. Shall be a septic tank or tanks sized with consideration of estimated daily flow.
2. All septic tanks shall be at least 1,000 gallons.
3. All pipe going to the first tank and in between tanks shall be four-inch (4”) diameter schedule 40 PVC.
4. Each tank will be equipped with at least a visual high-level alarm. Audio and visual alarms are recommended.
5. Each septic tank must have at least one port with access above grade. Risers are required if the lid of the tank is not installed at grade.
6. Lids must remain secured at all times except for when the tanks are being pumped.
7. The tanks must be located to allow for easy pumping access.
8. The tanks must meet all isolation distances of the Code.
9. Consider placing the tanks in a position that could be incorporated in a future OSTDS.
10. If the pump and haul system serves a building connected to a water supply, a device must be installed that will turn off the water to the building when the tank’s high-water alarm is activated.
11. The tanks may only be pumped by a Michigan Licensed Septage Waste Hauler.
12. The Department may require written documentation showing pumping frequency.
13. The Department shall require a maintenance agreement that allows for inspection at any time.
Vault Privy and Outhouse Buildings

1. A concrete septic tank shall be used on clay sites and sites where the seasonal high-water table is within three feet (3’) of natural grade as determined by evaluation of a test hole.
2. A vault privy will utilize at least a 1,000-gallon septic tank.
3. The septic tank should be installed in a location that would allow it to be incorporated into a future OSTDS.
4. The septic tank should be installed in a location that allows easy access for pumping.
5. Tank lids must be secured at all times except for when the tank is being pumped.
6. A suggested building design for the privy is given in the diagram below.
7. Grade area next to the privy in order to direct surface water away from privy.
8. High nitrogen fertilizer or commercial chemical preparation can be used to control odors.

Figure 2: Vault Privy/ Outhouse Construction
Elevated Mound

1. Effective Soil Depth:
   a. Level ground: A minimum of three feet (3’) of soil shall be maintained between the bottom of the absorption system and the limiting zones when sewage effluent is untreated.
   b. Sloping ground: For untreated effluent, the effective soil depth is three feet (3’).

2. Limiting zones include:
   a. Excessively permeable zones: fractured bedrock, coarse sand, gravel.
   b. Seasonal high-water table.
   c. Clay and clay loam.

3. Fill requirements include:
   a. The texture of the fill material shall be medium sand.
   b. Fill shall be free of debris, stones, frozen clods, or ice.
   c. The material shall be compacted to avoid settling (or allowed to settle through one fall-winter-spring time period).
   d. Other soil textures other than medium sand will be considered, but must be approved by the Department before installation.

4. The minimum absorption area, in square feet of bottom area, is 300 square feet per bedroom.

5. Pipe and stone raised mound systems require filter fabric, straw, or hay cover.

6. The estimated minimum drain field stone requirements are:

<table>
<thead>
<tr>
<th>Bed Area (ft²)</th>
<th>Cubic Yards</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>500</td>
<td>21</td>
<td>29</td>
</tr>
<tr>
<td>600</td>
<td>24</td>
<td>33</td>
</tr>
<tr>
<td>700</td>
<td>27</td>
<td>38</td>
</tr>
<tr>
<td>750</td>
<td>30</td>
<td>41</td>
</tr>
<tr>
<td>800</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>900</td>
<td>35</td>
<td>48</td>
</tr>
<tr>
<td>1000</td>
<td>39</td>
<td>54</td>
</tr>
<tr>
<td>1200</td>
<td>46</td>
<td>64</td>
</tr>
<tr>
<td>1400</td>
<td>54</td>
<td>75</td>
</tr>
<tr>
<td>1500</td>
<td>58</td>
<td>80</td>
</tr>
<tr>
<td>1600</td>
<td>61</td>
<td>85</td>
</tr>
<tr>
<td>1800</td>
<td>69</td>
<td>96</td>
</tr>
<tr>
<td>2000</td>
<td>76</td>
<td>106</td>
</tr>
</tbody>
</table>

7. In systems where the absorption field is located above the natural ground surface, a berm of soil shall be added around the perimeter of the absorption system such that the edges of the level berm are:
   a. Ten feet (10’) beyond the nearest sidewall of the absorption system for all mound systems installed on clay sites.
   b. Four feet (4’) beyond the nearest sidewall of the absorption system for all mound systems installed on any sites other than clay, where the base of the stone in the absorption system will be a full 36 inches above existing natural grade.
c. Two feet (2’) beyond the nearest sidewall of the absorption system for all mound system installed on any sites other than clay, where the base of the stone in the absorption system is less than 36 inches above existing natural grade.

8. Beyond the level berm, soil shall be evenly graded from the top of the berm to the natural soil surface with a slope of 3:1 (three horizontal to one vertical).

9. The disposal field area shall be covered with sufficient suitable soil to maintain vegetation growth and be seeded/mulched upon completion.

10. Chambers of any kind are not permitted in an elevated mound system due to a higher risk of failure.

**Pressure Dosed Mound**

![Pressure Dosed Mound Construction](image)

*Figure 3: Pressure Dosed Mound Construction*

![Pressure Dosed Mound Cross Section](image)

*Figure 4: Pressure Dosed Mound Cross Section*
Advanced Treatment Units

Advanced treatment units (ATUs) provide additional effluent treatment, typically between a septic tank and the drainfield, reducing suspended solids, oxygen demand, nutrients, and pathogens. ATUs are often installed as a way to decrease drainfield size and/or amount of fill above a restricting layer or seasonal high-water table.

Conditions for Approval

1. Provide a scaled site plan detailing the proposed work. Include the following:
   a. Locations of: property lines, all structures, driveways, and roads, applicant’s water supply well, applicant’s sewer line, septic tank, treatment tank, effluent disposal mechanism, adjacent property wells and sewage disposal/treatment systems within 50 feet of applicant’s property line, surface water, wetlands.
   b. Soil profile/conditions: soil type and depth above limiting layer.
2. A Michigan registered sanitarian, a professional engineer specializing in environmental or sanitary wastewater treatment, or a registered sewage system installer shall provide the design.
3. Manufactured mechanical treatment devices shall be NSF approved, and all materials shall be durable, corrosion resistant, and designed for their intended use.
4. Maintenance Contracts
   a. The property owner shall maintain a maintenance contract with the manufacturer, distributor, or installer of an extended aeration or other advanced sewage treatment system.
   b. A copy of the maintenance contract shall be submitted to the Department.
   c. The contract will give the Department permission to conduct maintenance and operation inspections.
5. An affidavit/attachment to the deed shall be filed with the County Clerk indicating the property contains an extended aeration sewage treatment system and the property limitation imposed by such a system. The property owner is responsible for filing and paying any associated fees. The property owner shall provide evidence that such affidavit/attachment has been filed before the Department issues the construction permit.

Inspections and Maintenance

1. An annual inspection will verify that the following are satisfactory:
   a. Alarm panel.
   b. Effluent clear and odorless.
   c. Scum layer.
   d. Aerator and filters.
   e. Water levels.
   f. Bolts and physical parts.
   g. Sludge level in ATU.
   h. Disposal field for breakouts or soft spots.
   i. Additional inspection as needed.
2. If any part above is not satisfactory, corrections will be made including the following as needed:
   a. Repair of alarm panel, circuit breaker, and alarm light.
   b. Correction of scum layer problem.
c. Cleaning and repairing/replacing aerator filters.
d. Repair of liquid flow through outflow pipe.
e. Routine physical maintenance on equipment and mechanical parts.
f. Pumping ATU and/or septic tank.
g. Repair/replacement of disposal field.
h. Additional corrections as needed.

3. Periodic sampling of the effluent may include the following tests:
   a. Five-day Biological Oxygen Demand (BOD₅).
   b. Total suspended solids (TSS).
   c. Fecal coliform bacteria.
   d. Additional testing as required.

4. Effluent quality that exceeds the following limits will require investigation as the reason and correction:
   a. BOD – 30 mg/L
   b. TSS – 30 mg/L
   c. Monthly geometric mean of 100,000 fecal coliform-colony forming units (CFU) per 100 mL or 30-day geometric mean of less than 200-800 fecal coliform per 100 mL.

Wastewater Treatment Pond (Lagoon)

Currently, New Permits for Lagoon Systems Are Not Being Issued

A lagoon is a pond sealed with a natural or synthetic liner and into which sewage from a household or small business is discharged, after first being treated by a septic tank(s). Bacteria digest the solids in the presence of oxygen, and the liquid is evaporated into the atmosphere. A second cell may be utilized to provide very slow infiltration into the surrounding soils.

Conditions for Approval

1. Site Criteria
   a. The minimum parcel size for the installation of a wastewater treatment pond shall be ten (10) acres. The edge of a lagoon berm shall be located a minimum of 100 feet from the nearest lot line.
   b. In addition to parcel size, the site must be isolated to provide surface discharge, if necessary, and isolation from private and/or public development.
   c. The site must be unsuitable for conventional on-site sewage disposal by containing clay soils with an estimated percolation rate of 60 minutes per inch or greater.
   d. The bottom of the finished lagoon must not be constructed within six inches of the maximum seasonal high groundwater.
   e. The site must be located in an area of maximum exposure to sun and wind.
   f. Slope must not be greater than twelve (12) percent.

2. Restrictive Covenant
   a. A restrictive covenant in the form of an affidavit stating the minimum agreed upon site size shall be signed by the applicant and recorded with the Register of Deeds in Chippewa County.
b. An agreement shall be executed between the applicant and the Department to allow access for inspection, performance of required maintenance, and conformance to discharge requirements.

3. Design Criteria
   a. Lagoon size: The lagoon shall be sized to provide at least six (6) months effective storage capacity according to the following usage:
      i. One, two, and three bedrooms: 340 gallons/day, 60 feet diameter = 2,826 square feet surface area, 74,374 gallons total volume, 51,573 gallons effective storage.
      ii. Four bedrooms: 440 gallons/day, 70 feet diameter = 3,846 square feet surface area, 106,650-gallon total volume, 72,345 gallons effective storage.
      iii. Commercial establishments use the following calculation to determine lagoon size:

          \[ A = \frac{(\text{gallons/day}) \times (\text{BOD, mg/l}) \times (8.35 \times 10^{-6}) \times 43,560 \text{ ft}^2}{20 \text{ lbs/acre/day}} \]

   b. Pond Shape
      i. The shape of all ponds shall be that there are no narrow or elongated portions.
      ii. Round, square, or rectangular ponds with a length not exceeding three (3) times the width.
      iii. Dikes shall be rounded at corners to minimize accumulations of floating materials and allow for wind action.

4. Location
   a. In an area not subject to surface water runoff, flooding, or natural drainage as evident by contour.
   b. In an area convenient to a discharge area.
   c. Isolation from:
      i. Public water supplies:
         - Type I – 800 ft.
         - Type II – 200 ft.
         - Type III – 200 ft.
      ii. Private water supplies – 50 ft.
      iii. Surface water – at least 200 ft.
      iv. Slopes greater than 6% – minimum of 25 ft.
      v. Property lines – at least 100 ft.
      vi. Dwelling that is served by the lagoon – 200 ft.
      vii. Dwellings (adjoining or adjacent) – 400 ft.

5. Construction
   a. Berms shall be constructed of impervious material such as clay or bentonite, and compacted. Vegetation and other unsuitable materials shall be removed from the area where the berm is placed. Berm shall be constructed clay-on-clay.
      - Top width – four (4) feet minimum.
      - Slopes:
        |          | Maximum | Minimum |
        |----------|---------|---------|
        | Inner    | 3:1     | 4:1     |
        | Outer    | 3:1     | N/A     |
   b. The berm shall be seeded or adequately protected from erosion.
   c. Free Board – two feet (2’’) minimum with a recommended slope of 3:1.
   d. The lagoon depth below natural grade must be three to five feet.
   e. Influent line:
i. Must be four-inch (4”) diameter schedule 40 PVC or 4-inch (4”) SDR 35 for gravity flow.

ii. Must be one-and-one-half inch (1 ½”) to 2-inch (2”) diameter schedule 40 or black plastic water line for pump systems.

iii. Placed horizontally, not to exceed eight inches (8”) above zero grade.

iv. Terminating at the center of the pond.

v. Must have bi-directional clean-outs every 100 feet.

vi. Gravity flow from septic tank with the outlet of the tank at or above the berm elevation, or

vii. If the sewage is pumped to the lagoon, a valve must be installed in the line which will permit repairs without draining the lagoon and which will prevent backflow of effluent from the lagoon to the pumping chamber.

6. Discharge Criteria
   a. Discharge shall be at the direction of the Health Officer for volume control or weed control.
   b. Discharge water shall be drawn from six inches (6”) below the surface and not drawn down below the two foot (2’) minimum operating depth.
   c. Discharge shall be to ridge and furrow/irrigation to an area 100 feet wide by 200 feet deep or by other method approved by the Health Officer. Discharge area must be isolated in accordance with Section 4 above.
   d. Discharge area may only be used for crops that are not for direct human consumption.

7. Fencing
   a. The system must be fenced to exclude children, pets, and livestock.
   b. Location of the fence shall be a minimum of four feet (4’) outside the top of the berm’s inner slope.
   c. Warning sign required designating the nature of the facility and advising against trespassing.

8. Maintenance
   a. The berm and pond are to be maintained in a manner to prevent insect breeding, odors, erosion, silting, and weed growth.
   b. Volume control – The bottom two feet (2’) shall be filled within the first two months of operation and this volume shall be maintained at all times thereafter.
   c. The fence is to be maintained in good repair.
EVALUATING EXISTING OSTDS

Purpose: These evaluations are done when a new dwelling or commercial structure is connected to an existing septic system. They are also done when an increase in sewage volume is added to an existing system such as adding bedrooms or expansion of commercial buildings. An increase in sewage volume can only be determined by this Department. The Upper Peninsula Environmental Health Code gives specific guidance on evaluation of existing systems in Section 3-7. The Code states that approval of all new/increase usage needs to be made in writing by the Department.

Evaluation Procedures

1. The client should contact the Department to determine what information is available in the archive files. The Department can approve connection without evaluation in accordance with Code section 3-7.1. Written approval must be given.
2. When an evaluation must be done, the client must submit the application, complete questionnaire in detail, and pay the appropriate fee. The process for approval after inspection is given in sections 3-7.2 and 3-7.3.
   a. Depending on the information available, the Department may require the following:
      i. Septic tank pumped and lids left open for inspection of the tank, baffle, and filter.
      ii. A test hole dug next to the drainfield in order to determine soil type.
      iii. Exposing the corners of the drainfield and/or parts of the header to determine the field’s size and construction.
      iv. Access to the house or basement to inspect plumbing.
      v. The Department may require the homeowner to obtain written information from licensed plumbers, septage haulers, or septic installers.
   b. Approval must be given in writing. Recommendations and required corrections may be indicated.
      i. Recommendations might include increasing tank pumping frequency, removal of woody vegetation from drainfield.
      ii. Requirements with deadlines for correction might include: replacing baffle and filter, fixing lids, adding risers, fixing pump alarms, removing sump or footing drains or water treatment system discharges connected to the system, fencing of lagoons, removing vegetation from lagoons, repairing lagoon berm.
3. If the system cannot be approved, correction must be made or a written condemnation order must be issued by the Department. Systems that cannot be approved would include:
   a. Failing systems (sewage back up in structure or discharge to ground or water, lack of a septic tank or absorption system)
   b. Collapsed tanks, leaking tanks, or tanks not meant for septic applications.
   c. Septic tanks less than 75% of required capacity.
   d. Drainfield less than 75% of required size.
   e. Structure over 50% or more of the drainfield.
   f. Failure to meet isolation distances including field height above soil limiting layer and high-water table.
ATTACHMENT #4

Example Soils Evaluation Report
# Soil Evaluation Report

## Property Information
- **Owner:** Forest County Potawatomi Community
- **Property Location:** Govt. Lot 1/4 1/4 S 22 T 35 N R 15 E
- **Property Owner's Mailing Address:** P.O. Box 340 Crandon, Wis. 54520
- **City:** Crandon
- **State:** WI
- **Zip Code:** 54520
- **Phone Number:** 

## New Construction
- **Use:** Residential
- **Number of bedrooms:** Unknown
- **Code derived design flow rate:** Unknown
- **GPD:** na
- **Parent material:** 
- **Flood plain elevation, if applicable:** na
- **ft.**

## General Comments
- 
- Recommendations:

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth In.</th>
<th>Dominant Color Munsel</th>
<th>Redux Description Qu. Sz. Cont. Color</th>
<th>Texture</th>
<th>Structure Gr. Sz. Sh.</th>
<th>Consistence</th>
<th>Boundary</th>
<th>Roots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-8</td>
<td>10yr 3/2</td>
<td>none</td>
<td>sil</td>
<td>2 m gr</td>
<td>mfr</td>
<td>cw</td>
<td>3 co</td>
</tr>
<tr>
<td>2</td>
<td>8-26</td>
<td>10yr 4/4</td>
<td>none</td>
<td>cl</td>
<td>2 m sbk</td>
<td>mfi</td>
<td>cw</td>
<td>2 m</td>
</tr>
<tr>
<td>3</td>
<td>26-56</td>
<td>10yr 4/4</td>
<td>f2d 5yr 5/8</td>
<td>cl</td>
<td>0-M</td>
<td>mfi</td>
<td>cw</td>
<td>none</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth In.</th>
<th>Dominant Color Munsel</th>
<th>Redux Description Qu. Sz. Cont. Color</th>
<th>Texture</th>
<th>Structure Gr. Sz. Sh.</th>
<th>Consistence</th>
<th>Boundary</th>
<th>Roots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-7</td>
<td>10yr 3/2</td>
<td>none</td>
<td>sil</td>
<td>2 m gr</td>
<td>mfr</td>
<td>cw</td>
<td>3 co</td>
</tr>
<tr>
<td>2</td>
<td>7-17</td>
<td>10yr 4/4</td>
<td>none</td>
<td>cl</td>
<td>2 m sbk</td>
<td>mfi</td>
<td>cw</td>
<td>2 m</td>
</tr>
<tr>
<td>3</td>
<td>17-48</td>
<td>10yr 4/4</td>
<td>f2d 5yr 5/8</td>
<td>cl</td>
<td>0-M</td>
<td>mfi</td>
<td>cw</td>
<td>none</td>
</tr>
</tbody>
</table>

## Soil Application Rate
- **GPD:**
  - **Effluent #1:** .6
  - **Effluent #2:** .8

**Note:** Effluent #1 = BOD₅ > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L

**Address:** 3515 USH 8, Cavour, Wisconsin 54511

**Signature:**

**CST Number:** 224982

**Date Evaluation Conducted:** June 27, 2016

**Telephone Number:** 715-674-5700
<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth in.</th>
<th>Dominant Color Munsell</th>
<th>Redux Description Qu. Sz. Cont. Color</th>
<th>Texture</th>
<th>Structure Gr. Sz. Sh.</th>
<th>Consistence</th>
<th>Boundary</th>
<th>Roots</th>
<th>Soil Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.8</td>
<td>10yr 3/2</td>
<td>none</td>
<td>sil</td>
<td>2 m gr</td>
<td>mfr</td>
<td>cw</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>2</td>
<td>8-19</td>
<td>10yr 4/4</td>
<td>none</td>
<td>cl</td>
<td>2 m sbk</td>
<td>mfr</td>
<td>cw</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>3</td>
<td>19-48</td>
<td>10yr 4/4</td>
<td>f2d 5yr 5/8</td>
<td>cl</td>
<td>0 M</td>
<td>mfr</td>
<td>cw</td>
<td>none</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth in.</th>
<th>Dominant Color Munsell</th>
<th>Redux Description Qu. Sz. Cont. Color</th>
<th>Texture</th>
<th>Structure Gr. Sz. Sh.</th>
<th>Consistence</th>
<th>Boundary</th>
<th>Roots</th>
<th>Soil Application Rate</th>
</tr>
</thead>
</table>

* Effluent #1 + BOD<sub>5</sub> > 30 ≤ 220 mg/L and TSS > 30 ≤ 150 mg/L
* Effluent #2 = BOD<sub>5</sub> ≤ 30 mg/L and TSS ≤ 30 mg/L

The Department of SPS is an equal opportunity service provider and employer. If you need assistance to access services or needed material in an alternate format, please contact the department at 608-266-3151 or TTY 608-264-8777.
ATTACHMENT #5

Example Septic System Design and Site Plan
### Residential Application

**Project Name:** BE-20-K87

**Owner's Name:** Donelda R Schofield

**Owner's Address:** 12094 W Tower Rd

Brimley, MI 49715

**Legal Description:**

Township: Bay Mills

County: Chippewa

Subdivision Name: 

Lot Number: 

Block Number: 

Parcel I.D. Number: 

Plan Transaction No.: 

<table>
<thead>
<tr>
<th>Page</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Index and title</td>
</tr>
<tr>
<td>2</td>
<td>Data entry</td>
</tr>
<tr>
<td>3</td>
<td>Mound drawings</td>
</tr>
<tr>
<td>4</td>
<td>Lateral and dose tank</td>
</tr>
<tr>
<td>5</td>
<td>System maintenance specifications</td>
</tr>
<tr>
<td>6</td>
<td>Management and contingency plan</td>
</tr>
<tr>
<td>7</td>
<td>Pump curve and specifications</td>
</tr>
</tbody>
</table>

**Designer:** Indian Health Service

**License Number:**

**Date:** 06/13/23

**Phone Number:** 906-632-3151

**Signature:**

Designed Pursuant to the
Mound Component Manual for POWTS Version 2.0 SDB-10691-P (N. 01/01), and both
SSWMP Publication 9.6 Design of Pressure Distribution Networks for ST-SAS (01/81) and
Pressure Distribution Component Manual Ver. 2.0 SBD-10706-P (N. 01/01)
**Mound and Pressure Distribution Component Design**

**Design Worksheet**

### Site Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential or Commercial Design (R or C)</td>
<td>R</td>
</tr>
<tr>
<td>Estimated Wastewater Flow (gpd)</td>
<td>300.00</td>
</tr>
<tr>
<td>Peaking Factor (e.g. 1.5 = 150%)</td>
<td>1.50</td>
</tr>
<tr>
<td>Design Flow (gpd)</td>
<td>450.00</td>
</tr>
<tr>
<td>Site Slope (%)</td>
<td>0.00</td>
</tr>
<tr>
<td>Contour Line Elevation (ft)</td>
<td>514.00</td>
</tr>
<tr>
<td>Depth to Limiting Factor (in)</td>
<td>48.00</td>
</tr>
<tr>
<td>In-situ Soil Application Rate (gpd/ft²)</td>
<td>0.40</td>
</tr>
</tbody>
</table>

### Distribution Cell Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispersal Cell Length Along Contour (ft) =</td>
<td>45.00</td>
</tr>
<tr>
<td>Dispersal Cell Design Loading Rate (gpd/ft²)</td>
<td>1.00</td>
</tr>
<tr>
<td>Influent Wastewater Quality (1 or 2)</td>
<td>1</td>
</tr>
<tr>
<td>Cell Width (ft)</td>
<td>10.00</td>
</tr>
</tbody>
</table>

### Pressure Distribution Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center or End Manifold (C or E)</td>
<td>C</td>
</tr>
<tr>
<td>Lateral Spacing (ft)</td>
<td>0.00</td>
</tr>
<tr>
<td>Number of Laterals</td>
<td>1</td>
</tr>
<tr>
<td>Estimated Orifice Spacing (ft) =</td>
<td>10.23</td>
</tr>
<tr>
<td>Orifice Diameter (in)</td>
<td>0.125</td>
</tr>
<tr>
<td>Orifice Diameter (in)</td>
<td>0.50</td>
</tr>
<tr>
<td>Lateral Spacing (ft)</td>
<td>1.50</td>
</tr>
<tr>
<td>Forcemain Length (ft)</td>
<td>128.00</td>
</tr>
<tr>
<td>Forcemain Diameter (in)</td>
<td>508.00</td>
</tr>
<tr>
<td>System Head (ft) x 1.3</td>
<td>6.50</td>
</tr>
<tr>
<td>Vertical Lift (ft)</td>
<td>6.17</td>
</tr>
<tr>
<td>Friction Loss (ft)</td>
<td>3.96</td>
</tr>
<tr>
<td>In-line Filter Loss (ft)</td>
<td>0.50</td>
</tr>
<tr>
<td>Total Dynamic Head (ft)</td>
<td>17.13</td>
</tr>
</tbody>
</table>

### Lateral Diameter Selection

<table>
<thead>
<tr>
<th>Diameter (in)</th>
<th>Options</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.25</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>1.50</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2.00</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

### Manifold Diameter Selection

<table>
<thead>
<tr>
<th>Diameter (in)</th>
<th>Options</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Gallons/Inch Calculator (optional)

- Total Tank Capacity (gal)
- Total Working Liquid Depth (in)
- gal/in (enter result in cell B49)

### Treatment Tank Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic Tank Capacity (gal)</td>
<td>1000.00</td>
</tr>
<tr>
<td>Must be concrete</td>
<td></td>
</tr>
</tbody>
</table>

### Dose Tank Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose Tank Capacity (gal)</td>
<td>500.00</td>
</tr>
<tr>
<td>Dose Tank Volume (gal/in)</td>
<td>10.00</td>
</tr>
<tr>
<td>Must be concrete</td>
<td></td>
</tr>
</tbody>
</table>

### Effluent Filter Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PolyLok Commercial Filter Model Number</td>
<td>625</td>
</tr>
<tr>
<td>Filter Manufacturer</td>
<td></td>
</tr>
</tbody>
</table>

---

Project: BE-20-K87  Page 2 of 7
Mound Plan and Cross Section Views

Mound Component Dimensions

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10.00 ft</td>
<td>E</td>
<td>6.00 in</td>
</tr>
<tr>
<td>B</td>
<td>45.00 ft</td>
<td>F</td>
<td>9.50 in</td>
</tr>
<tr>
<td>D</td>
<td>6.00 in</td>
<td>G</td>
<td>0.50 ft</td>
</tr>
<tr>
<td>H</td>
<td>1.00 ft</td>
<td>K</td>
<td>6.88 ft</td>
</tr>
<tr>
<td>I</td>
<td>7.50 ft</td>
<td>L</td>
<td>58.75 ft</td>
</tr>
<tr>
<td>J</td>
<td>7.50 ft</td>
<td>W</td>
<td>25.00 ft</td>
</tr>
</tbody>
</table>

450.00 (ft²) Dispersal Cell Area
10.00 (gpd/ft) Linear Loading Rate

Mound Cross Section View

Aggregate Dispersal Area

Finished Grade 516.29 (ft)
Dispersal Cell Elevation 514.50 (ft)

Shading Key
1. Topsoil Cap
2. Subsoil Cap
3. ASTM C33 Sand
4. Tilled Layer
5. Aggregate

4 in. dia. slotted observation pipe

Dispersal Cell

Geotextile Fabric Cover

See lateral details on Page 4 for number, size, and spacing of laterals. Lateral are equally spaced from the distribution cell's center line in the distribution cell (AxB).
Center Connection Lateral Layout Diagram

Number of Lateral: 1
Lateral Diameter: 1.50 in
Lateral Length (P): 21.75 ft
Lateral Spacing (S): 0.00 ft
Lateral Flow Rate: 18.12 gpm
System Flow Rate: 18.12 gpm
Total Dynamic Head: 17.13 ft

Orifice Diameter: 0.125 in
Orifice Spacing (X): 0.50 ft
Orifices per Lateral: 44
Orifice Density: 10.23 ft²/orifice

Forcemain Velocity: 3.29 ft/sec

Dose Tank Information

Capacity: 500.00 Gallons
Volume: 10.00 gal/inch

Dimension

<table>
<thead>
<tr>
<th>Inches</th>
<th>Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>35.83</td>
</tr>
<tr>
<td>B</td>
<td>2.00</td>
</tr>
<tr>
<td>C</td>
<td>2.17</td>
</tr>
<tr>
<td>D</td>
<td>10.00</td>
</tr>
<tr>
<td>Total</td>
<td>50.00</td>
</tr>
</tbody>
</table>

Electrical as per NEC 300 and SPS 316.300 WAC
Locking cover with warning label and locking device and sealed watertight

Tank component is properly vented

Forcemain diameter: 1.5 in.

Weep hole or anti-siphon device

Pump off elevation (ft): 508.83
Dose tank elevation (ft): 508.00

Alarm Manufacturer
Alarm Model Number
Pump Manufacturer: Goulds
Pump Model Number: PE31
Pump Must Deliver: 18.12 gpm at 17.13 ft TDH

Note: Switches containing mercury may not be used in this system.

Project: BE-20-K87
Mound System Maintenance and Operation Specifications

Service Provider's Name
POWTS Regulator's Name

System Flow and Load Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Flow - Peak</td>
<td>450 gpd</td>
</tr>
<tr>
<td>Estimated Flow - Average</td>
<td>300 gpd</td>
</tr>
<tr>
<td>Septic Tank Capacity</td>
<td>1000 gal</td>
</tr>
<tr>
<td>Soil Absorption Component Size</td>
<td>450 ft²</td>
</tr>
<tr>
<td>Type of Wastewater</td>
<td>Domestic</td>
</tr>
<tr>
<td>Maximum Influent Particle Size</td>
<td>1/8 in</td>
</tr>
<tr>
<td>Maximum BOD5</td>
<td>220 mg/L</td>
</tr>
<tr>
<td>Maximum TSS</td>
<td>150 mg/L</td>
</tr>
<tr>
<td>Maximum FOG</td>
<td>30 mg/L</td>
</tr>
<tr>
<td>Maximum Fecal Coliform</td>
<td>&gt;10E4 cfu/100 mL</td>
</tr>
</tbody>
</table>

Service Frequency

<table>
<thead>
<tr>
<th>Component</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septic and Pump Tank</td>
<td>Inspect and/or service once every 3 years</td>
</tr>
<tr>
<td>Effluent Filter</td>
<td>Should inspect and clean at least once every 3 years</td>
</tr>
<tr>
<td>Pump and Controls</td>
<td>Test once every 3 years</td>
</tr>
<tr>
<td>Alarm</td>
<td>Should test monthly</td>
</tr>
<tr>
<td>Pressure System</td>
<td>Laterals should be flushed and pressure tested every 1.5 years</td>
</tr>
<tr>
<td>Mound</td>
<td>Inspect for ponding and seepage once every 3 years</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

Miscellaneous Construction and Materials Standards

1. Observation pipes are slotted and materials conform to Table SPS 384.30-1, have a watertight cap, and are secured in as shown in the mound component manual.
2. Dispersal cell aggregate conforms to SPS 384.30 (6)(i), Wis. Adm. Code.
3. All gravity and pressure piping materials conform to the requirements in SPS 384, Wis. Adm. Code.
4. Tillage of the basal area is accomplished with a mold board or chisel plow.
5. The mound structure and other disturbed areas will be seeded and mulched to prevent soil erosion and help reduce frost penetration.

Lateral Turn-up Detail

- Finished Grade
- 6-8" Diameter Lawn Sprinkler Valve Box
- Threaded Cleanout Plug or Ball Valve
- Distribution
- Long Sweep 90 or Two 45 Degree Bends Same Diameter as Lateral
CONSTRUCT 58.75 FT X 25 FT MOUND SYSTEM

CONSTRUCT 10 FT X 45 FT DISPERAL CELL AREA

INSTALL 1.5 IN DIAMETER LATERALS

INSTALL 128 LF OF 1.5 IN SEWER FORCE MAIN TO CENTER MANIFOLD

INSTALL SEPTIC AND PUMP TANK. EXISTING SEPTIC TANK TO BE PUMPED, CRUSHED, REMOVED AND REPLACED WITH NEW SEPTIC TANK.

INSTALL 15 LF 4 INCH PVC PIP

INSTALL 2 WAY CLEANOUT

SCHOEFIELD HOME

UNPAVED DRIVEWAY
ATTACHMENT #6

Example Bidding Documents
REQUEST FOR SERVICES

In-Ground Pressure Septic System Installation
for
3304 Indian Route 10, Crandon, WI 54520

SOKAOGON CHIPPEWA COMMUNITY
CRANDON, WISCONSIN
IHS Project No. BE-21-M21

September 2021

I. General Information: The Sokaogon Chippewa Community is soliciting proposals for the installation of an in-ground pressure septic system for a home site located at 3304 Indian Route 10, Crandon, WI 54520.

Quotations for the performance of work are due no later than 1:00pm on Tuesday, September 21st, 2021 and can be sent to: (E-MAILED BIDS ARE ACCEPTABLE)

Sokaogon Chippewa Community Housing Dept.
Attn: Joe Kane
3265 Indian Settlement Rd.
Cranndon, WI 54520
Mobile: (715) 622-0103
FAX: (715) 478-2865
joe.kane@scc-nsn.gov

For additional information on the work to be completed contact:

Nathan Kohnhorst
Indian Health Service
9A South Brown St.
Rhinelander, WI 54501
(715) 365-5117
nathan.kohnhorst@ihs.gov

II. Scope of Work: Installation of an in-ground pressure septic system for a home site located at 10645 N. Mole Lake Rd., Crandon, WI 54520. All work shall comply with the appropriate “Technical Specifications” attached with this request.

Specifications related to this site include the following:

- Section 01270 – Price and Payment
- Section 01310 – Project Management and Coordination
- Section 01330 – Submittal Procedure
- Section 01420 – References
The Contractor shall comply with all Wisconsin State Codes and Tribal regulations related to the completion of the work. The Contractor shall be responsible for getting utilities marked, protecting existing utilities, and if damaged, repairing those utilities. The Contractor is also responsible to verify property lines and ensure all ground disturbance activities take place on the property described.

**The contract award shall be given as soon as possible after bids are received.**

### III. Notices to Prospective Bidders:
- Sokaogon Chippewa Community Indian Preference Policy applies
- Minimum percentage of work to be performed by the prime contractor is 33 1/3%
- Restrictions on liens (state lien laws do not apply on Federal trust land)
- Davis-Bacon wage rates are required (wage rate form attached)
- The Indian Health Service (IHS) will serve as the “Engineer” for this project and contribute the following:
  - Review and approval of submittals, payment requests and change orders
  - Site inspections including a final inspection of the facilities installed to determine if any punchlist items or warranty items exist and need to be corrected

### IV. Method of Measurement and Basis for Payment: Payment shall be made per job completed based on the appropriate quantities installed. Basis for payment is based on the attached specification 01270 – Price & Payment.

**ATTACHMENTS TO THIS REQUEST FOR SERVICES:**
- Bid Schedule – Septic Systems
- Specification 01270 – Price & Payment
- In-Ground Pressure Septic System Design
- Soil Evaluation Report
- Davis Bacon Wage Rates
- Technical Specifications
REQUEST FOR PRICES

BID SCHEDULE - SEPTIC SYSTEMS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
<th>UNIT</th>
<th>PRICE</th>
<th>TOTAL PRICE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Amy Morningstar In-Ground Pressure System</td>
<td>1</td>
<td>LS</td>
<td></td>
<td></td>
<td>Review Request for Services Package and Technical Specifications Provided.</td>
</tr>
</tbody>
</table>

Name & Company

Date
Pressure Distribution Component Design
Design Worksheet

Site Information
*(r or c)*  
- **300.00** Estimated Wastewater Flow (gpd)
- **1.50** Peaking Factor (e.g. 1.5 = 150%)
- **450.00** Design Flow (gpd)
- **0.00** Site Slope (%)
- **58.00** Depth to Limiting Factor (in)
- **0.70** In-situ Soil Application Rate (gpd/ft²)

Distribution Cell Information
- **84.00** Dispersal Cell Length Along Contour (ft)
- **97.30** Cell Elevation (ft)
- **100.50** Final Grade Elevation (ft)
- **2** Number of Dispersal Cells
- **1** Influent Wastewater Quality (1 or 2)

Pressure Distribution Information
- **3.00** Spacing Between Distribution Cells (ft)
- **3.83** Dispersal Cell Width (ft)
- **2** Number of Lateral Dispersals
- **0.156** Orifice Diameter (in)
- **7.66 ft²/orifice** Estimated Orifice Spacing (ft)
- **2.00** Forcemain Diameter (in)
- **8.13** Vertical Lift (ft)
- **13.05** System Head (ft) x 1.3

Lateral Diameter Selection

<table>
<thead>
<tr>
<th>in. dia.</th>
<th>options</th>
<th>choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.50</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

Manifold Diameter Selection

<table>
<thead>
<tr>
<th>in. dia.</th>
<th>options</th>
<th>choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.50</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Treatment Tank Information
- **1000.00** Septic Tank Capacity (gal)
- **ABC** Manufacturer

Dose Tank Information
- **600.00** Dose Tank Capacity (gal)
- **12.50** Dose Tank Volume (gal/in)
- **ABC** Manufacturer

Gallons/Inch Calculator (optional)
- **600.00** Total Tank Capacity (gal)
- **48.00** Total Working Liquid Depth (in)
- **12.50** gal/in (enter result in cell B48)

Effluent Filter Information
- **Poly-lok** Filter Manufacturer
- **PL-525** Filter Model Number

Project:  Amy Morningstar
Distribution Cell Plan View

Distribution Cell Component Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.83 ft</td>
</tr>
<tr>
<td>B</td>
<td>84.00 ft</td>
</tr>
<tr>
<td>F</td>
<td>9.50 in, 1/10B, 8.40 ft</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cells</td>
<td>2</td>
</tr>
<tr>
<td>Individual Cell Area</td>
<td>321.72 ft²</td>
</tr>
<tr>
<td>Total Cell Area</td>
<td>643.44 ft²</td>
</tr>
</tbody>
</table>

Typical Distribution Cell Cross Section View

Aggregate Distribution Area

Shading Key

Aggregate

Note: See lateral details on Page 4 for the number of laterals, size, and spacing. Laterals are centered in the distribution cell as per component manual requirements.
End Connection Lateral Layout Diagram

Number of Laterals 2
Lateral Diameter 1.50 in
Lateral Length (P) 82.50 ft
Lateral Spacing (S) 6.83 ft
Lateral Flow Rate 22.62 gpm
System Flow Rate 45.23 gpm
Forcemain Diameter 2.00 in

Orifice Diameter 0.156 in
Orifice Spacing (X) 2.01 ft
Orifices per Lateral 42
Orifice Density 7.66 ft^2/orifice
Forcemain Velocity 4.62 ft/sec

Dose Tank Information

ABC
Capacity 600.00
Volume 12.50

Dimension | Inches | Gallons
---|---|---
A | 24.88 | 311.05
B | 2.00 | 25.00
C | 7.12 | 88.95
D | 14.00 | 175.00
Total | 48.00 | 600.00

Electric as per NEC 300 and Comm 16.28 WAC

Tank component is properly vented

Locking cover with warning label and locking device and sealed watertight

Alternate outlet location

Pump off elevation (ft) 89.67
Dose tank elevation (ft) 88.50

Alarm Manufacturer SJE Rhombus
Alarm Model Number 101-01H Tank Alert 1
Pump Manufacturer Zoeller
Pump Model Number N137
Pump Must Deliver 45.23 gpm at 16.00 ft TDH

Project: Amy Morningstar
### In-ground System Specifications

<table>
<thead>
<tr>
<th>Service Provider's Name</th>
<th>Phone</th>
<th>POWTS Regulator's Name</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Design Flow - Peak**: 450 gpd
- **Estimated Flow - Average**: 300 gpd
- **Septic Tank Capacity**: 1000 gal
- **Soil Absorption Component Size**: 321.72 ft²
- **Type of Wastewater**: Domestic

### Dispersal System Influent Limits

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Influent Particle Size</td>
<td>1/8 in</td>
</tr>
<tr>
<td>Maximum BOD5</td>
<td>220 mg/L</td>
</tr>
<tr>
<td>Maximum TSS</td>
<td>150 mg/L</td>
</tr>
<tr>
<td>Maximum FOG</td>
<td>30 mg/L</td>
</tr>
<tr>
<td>Maximum Fecal Coliform</td>
<td>10E6 cfu/100 mL</td>
</tr>
</tbody>
</table>

### Service Frequency

- **Septic and Pump Tank**: Inspect and/or service once every 3 years
- **Effluent Filter**: Inspect once a year and clean once every 3 years
- **Pump and Controls**: Test once every 3 years
- **Alarm**: Should test monthly
- **Pressure System**: Lateral flushed and pressure tested once every 1.5 years
- **Dispersal Area**: Inspect once every 3 years
- **Other**: Should inspect once a year and clean once every 3 years

### Miscellaneous Construction and Materials Standards

1. Observation pipes are slotted or perforated and materials conform to Table Comm 84.30-1, have watertight cap, and are secured in as shown in the mound component manual.
2. Dispersal cell aggregate conforms to Comm 84.30 (6)(i), Wis. Adm. Code.
3. All gravity and pressure piping materials conform to the requirements in Comm 84, Wis. Adm. Co.

### Lateral Turn-up Detail

- **Finished Grade**
- **6" Diameter Lawn Sprinkler Valve Box**
- **Threaded Cleanout Plug or Ball Valve**
- **Distribution Lateral**
- **Long Sweep 90 or Two 45 Bends Same Diameter as Lateral**

---

Project: Amy Morningstar

Page 5 of 6
Unable to locate Well.

Home may be served by a municipal water supply. Any new Well shall be at least:

- 50' from drainfield, and
- 25' from septic tank.

---

Jeremy D. Kaus
CST# 992977
W8125 Airport Road
Crivitz, WI 54114

Sokaogon Chippewa Community
3 Bedroom Home
Town of Nashville, Forest County, Wisconsin

---

- Seed, fertilize, mulch all disturbed areas

- Pump, abandon, remove existing tanks offsite.
- Install 2-way cleanout with frost sleeve.
- Install new 1000/650 combo tank, expose all 3 tank lids.

- Install 2 lateral in-ground pressure (pipe/stone) drainfield.
- Install observation and vent pipes 12-24" above final grade.
- Install turnup covers at finished grade.
PART 1 - GENERAL

1.01 SUMMARY

A. Work covered by this section includes method of measurement and basis of payment for all divisions included.

B. Payment for the various items of the Bid Schedules, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, materials, labor, supplies, manufactured articles, transportation, and temporary facilities required to complete the work in accordance with contract documents including incidentals.

C. Respective prices and payment shall constitute full compensation for all work completed including incidentals.

D. All items not expressly listed as being provided by others that are necessary for the completion of work shall be furnished and installed by the Contractor.

E. No payment shall be made for mobilization and demobilization of equipment.

1.02 ESTIMATED QUANTITIES

A. All quantities stipulated in the bid schedule or other contract documents are approximate and are to be used: (1) as a basis for estimating the probable cost of the work and (2) for the purpose of comparing the bids submitted.

B. The Contractor shall be paid for actual quantities installed based on the quantities measured in the field. The actual amounts of work completed and materials furnished may differ from estimated quantities. The Contractor shall make no claim for damages, anticipated profits, or otherwise, on account of differences between the estimated amounts and the actual amount of work performed and materials furnished.

1.03 SURVEY AND MEASUREMENTS

A. All quantity measurements shall be the responsibility of the Contractor and will be verified by the Engineer.

B. All measurements and subsequent payments will be based on completed and accepted work performed in strict accordance with the drawings, specifications, and other contract documents.
PART 2 - BID SCHEDULE ITEMS

2.01 GENERAL

A. Payment shall be full compensation to complete the work items in good faith, including incidental work.

B. In addition to the those things listed under each item, the unit price bid shall be full compensation for all of the following:

1. General requirements in Division 01, but not limited to the following.
   a. Submittals
   b. Record drawings

2. Specific requirements in Division 02, including but not limited to the following (unless otherwise expressly defined as a line item in the bid schedule):
   a. Erosion control.
   b. Silt fencing.
   c. Rock Excavation.
   d. Dewatering.
   e. Clearing and grubbing.
   f. Removal and replacement of obstructions.
   g. Associated trenching, excavation and backfill including the removal of any nuisance water, suitable materials for bedding & backfill, bedding, haunching, and compaction.
   h. Disposal of any excess material.
   i. Traffic control.
   j. Culverts, any removal & replacement of existing or new installation.
   k. Any required utility work, and
   l. Finish work, including rough grading, plant preparation mats, topsoiling, seeding, mulching, fertilizing and landscaping.

2.02 BID ITEMS

A. Payment shall be as described below for all of the following items included on the Bid Schedule.

1. Amy Morningstar In-Ground Pressure System
b. Basis for Payment: Includes all labor, materials, equipment and all other incidentals required to procure and install a wastewater in-ground disposal system. Payment shall include the following work:

- Pumping and removal offsite of existing concrete tanks including all appurtenances.
- Appropriate clearing, grubbing, and removal offsite of debris.
- The installation of 4-inch sewer pipe (~30 ft.), 2-way cleanout with frost sleeves, 1,650 gallon combo tank with risers and covers, filter, effluent pump with controls/alarm, electrical wiring, ~80 feet of 2-inch PVC forcemain, ~165 feet of 1.5-inch PVC laterals, washed stone, typar fabric, vent pipes, observation pipes, turn-ups, seed, fertilize & mulch of all disturbed areas for the installation of the septic system in accordance with the details and the specifications. **Note:** Forest County Permit is not required for this site.

PART 3 – EXECUTION (N/A)

END OF SECTION
SECTION 01310
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the preconstruction conference, construction scheduling and coordination requirements.

1.02 PRE-CONSTRUCTION CONFERENCE

A. Required after award of contract and prior to start of construction.

B. Representatives from the following shall attend.

1. Prime Contractor
2. Subcontractors
3. Engineer and Technical Representative
4. Owner’s Representative

C. Engineer will arrange a date that is mutually acceptable to all parties planning to attend.

D. Contractor shall notify subcontractors of time and date of meeting.

1.03 CONSTRUCTION SCHEDULE

A. Present Engineer with a written preliminary construction schedule containing start and completion dates of the major items at the preconstruction meeting.

B. Notify the Engineer seven (7) days in advance of any construction.

C. Communicate major changes to the schedule to the Engineer in writing.

1.04 WORKING HOURS/DAYS

A. Except as required for safety purposes, all work shall be performed during regularly scheduled working hours. The Contractor shall not work on Saturday, Sunday, or a Federal holiday without the Owner and Engineer’s consent.

1.05 COORDINATION WITH OTHER CONTRACTORS/UTILITIES

A. Coordinate work with other contractors (i.e. roads, building, etc) in the area as necessary to complete the work specified.
B. Coordinate work with local utilities (i.e. water and sewer, power, telephone). Note: all buried utilities may not be shown on the plans. Contractor’s responsibility for having utilities marked prior to construction.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. This section includes information on submittal procedures. Materials requiring submittal are listed in the appropriate specification section.

1.02 SUBMITTAL PROCEDURES

A. Submit copies of submittals to the Engineer, unless requested otherwise.

1. Contractor’s option:
   i. Two (2) hard copies.
   ii. An electronic copy in pdf format delivered to Engineer via email or other means as approved by the Engineer.

B. Identify each cut sheet or shop drawing with the following information:

1. Contract number.
2. Supplier.
3. Specification section to which the submittal pertains.

C. Submit the following information, as applicable:

1. Manufacturer's cut sheets indicating compliance with references (e.g. applicable ASTM, AWWA standards).
2. Laboratory results, as applicable.
3. Dimensional drawings or shop drawings, as applicable.
4. Other information necessary for the Engineer to determine compliance with the specifications.
5. Clearly identify brand, manufacturer, model number, sizes, and all other information on each cut sheet to identify the exact product being submitted for approval.

D. Identify variations from the contract documents and product or system limitations that may be detrimental to successful performance of the completed work.

E. Revise and resubmit submittals as required and identify all changes made since previous submittal.

F. Distribute copies of reviewed submittals to concerned parties, (i.e. suppliers, sub-contractors).
G. Submit written communication of any inability to comply with the Engineer’s comments.

H. Submit information to the Engineer at least three weeks in advance of the work to be performed.

I. Approval of submittals must be provided by the Engineer prior to installation of materials.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. This section includes a list of common organizations, associations or appropriate agencies with jurisdiction that have references, standards, laws or regulations cited in these specifications. This list is not all-inclusive. Other agencies (county, local, tribal) with jurisdiction might not be listed here.

B. Use latest revision of all references, standards, laws or regulations.

1.02 LIST OF ORGANIZATIONS, ASSOCIATIONS & AGENCIES

A. National Standards Organizations & Associations

American Association of State Highway and Transportation Officials (AASHTO)
444 North Capital Street NW, Suite 249
Washington DC, 20001
(202) 624-5800
www.aashto.org

American Concrete Institute (ACI)
ACI International
PO Box 9094
Farmington Hills, Michigan 48333-9094
(810) 848-3700
www.aci-int.org

American Society for Testing and Materials (ASTM)
100 bar Harbor Drive
West Conshohocken, Pa 19428-2959
(610) 832-9585
www.astm.org

National Electric Code (NEC)
National Fire and Protection Association
1 Battery March Park
Quincy, MA 02269-9959
1 888 632-2633
www.nec.com

American Water Works Association AWWA
6666 West Quincy Avenue
Denver, CO 80235
(303) 794-7711
www.awwa.org

Underwriters' Laboratories, Inc. UL
333 Pfingston Road
Northbrook, IL 60062
(847) 272-8800
www.ul.com

B. Federal Agencies

Environmental Protection Agency (EPA)
Region 5
77 West Jackson
Chicago, IL 60604-3507
http://www.epa.gov/r5water/

Occupational Health and Safety Administration
Region 5 (OSHA)
238 South Dearborn Street, Room 3244
Chicago, IL 60604
www.osha.gov
C. State Agencies

Michigan Department of Transportation MIDOT
1601 Lunington Street
PO Box 355
Escanaba, MI 49829
(906) 786-1800
www.mdot.state.mi.us

Michigan Dept. of Consumer & Industry Services
G. Mennen William Bldg.
525 W. Ottawa
P.O. Box 30004
Lansing, MI 48909
(517) 373-1820
www.cis.state.mi.us

Michigan Department of Environmental Quality
Surface Water Quality Division
Storm Water Program
P.O. Box 30438 Lansing, MI 48909
www.deq.state.mi.us/swq/stormw/stormw.htm

Michigan Department of Environmental Quality
The Office of Drinking Water and Municipal Assistance
P.O. Box 30241 Lansing, MI 48909-7741
http://www.michigan.gov/deq/0,4561,7-135-3313_51002---,00.html

D. Local Agencies

1. Contractor shall review other local agency requirements to determine applicability with this project.

E. Tribal Organizations

1. See Section 01100 for appropriate tribal contact regarding tribal laws.
PART 2 – PRODUCTS (N/A)

PART 3 – EXECUTION (N/A)

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. This section includes prerequisites and procedures to assure the quality of construction.

1.02 SUBMITTALS

A. Contractor Name and License Number

1.03 INSTALLER QUALIFICATIONS

A. Work shall be performed under the direction of personnel licensed in the state/reservation where the project is proposed and where licensing of the trade is regulated by the state/reservation including, but not limited to, plumbing, well drilling, septic system installation, HVAC, and electrical work.

1.04 CONTROL OF INSTALLATION

A. Review materials for acceptability when delivered to the site.

B. Store and handle materials to prevent damage.

C. Review materials, services, and workmanship to ensure that work is performed in accordance with the specifications.

D. Comply fully with manufacturers’ instructions.

E. Should manufacturers’ instructions conflict with contract documents, request clarification from Engineer before proceeding.

F. Correct defective work to the satisfaction of the Project Engineer.

1.05 MANUFACTURER’S FIELD SERVICES

A. Provide reports on observations and documentation of workmanship to the Engineer within 30 days of visit for review where manufacturers’ field services are provided.

1.06 WARRANTY
A. Provide a minimum one (1) year warranty for all materials and labor, covering defects in the materials or deficiencies resulting from contractor installation.

B. Provide additional warranties as required under other sections.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. Section includes information on closeout procedures and final cleaning.

1.02 RELATED WORK

A. Section 01780 – Closeout Submittals

1.03 CLOSEOUT PROCEDURES

A. Submit written certification that work is complete in accordance with contract documents and ready for final inspection at least three (3) working days prior to final inspection.

B. Provide warranties and record documents (e.g. as-built drawings) to the Engineer that are required within ten (10) days after date of first beneficial use. Refer to Section 01780.

1.04 FINAL CLEANING

A. Complete final clean-up prior to final inspection.

B. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 FINAL INSPECTION

A. A final inspection of the facilities shall be conducted in the presence of the Owner, the Engineer, and the Contractor, at a minimum.

B. Final inspection shall include inspection of all facilities installed under the project.

1.06 PUNCH LIST

A. Any deficiencies noted at the Final Inspection will be communicated to the Contractor through a letter from the Engineer.

B. All deficiencies will need to be completed before full payment is made.

C. Retainage for punch list items shall be based on the estimated cost to retain another contractor to finish the deficient work items.

END OF SECTION
SECTION 01780
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. This section describes the requirements for closeout submittals including, record drawings, warranty information and general operation and maintenance information.

1.02 RELATED WORK

A. Section 01430 – Quality Assurance
B. Section 01770 – Closeout Procedures
C. Section 01785 – Operation and Maintenance Manuals (If applicable)

1.03 DELIVERY

A. Provide all closeout submittals meeting these requirements and any specific requirements of each section.

B. Closeout submittals must be received before payment is requested for the work that the drawings describe or illustrate.

C. All closeout submittals must be received in a correct and complete manner before final payment can be made. If material is deficient, the deficiencies will be indicated in punch lists (Section 01770).

1.04 DEFINITIONS

A. Record Drawing: A drawing showing the actual installation of facilities, showing changes from the plans, and showing detail enough that future persons can readily locate all objects.

B. Ties: Measurements from permanent easily located objects to an installed object.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 RECORD DRAWINGS

A. Provide record data in one of the following manners:
1. On a set of project drawings, neatly draw tie measurements and changes.
2. On separate 8½ X 11 sheets (see 01780D – Closeout Submittal Drawings), neatly draw site sketches, structure sketches, etc., indicating the necessary information.

B. Provide three (3) swing tie measurements to all buried utility objects that may need to be located in the future, including, but not limited to:

   1. Gate valves
   2. Corporation stops
   3. Curb stops
   4. Water main fittings
   5. Couplings to existing water systems.
   6. Cleanouts
   7. Sewer wyes.
   8. Utility crossings.
   9. Septic tank manholes and access covers.
  10. Corners of drainfields
  11. Tracer Wire Boxes

C. Provide offset measurements for buried utilities (e.g. water main) installed parallel to roads.

D. Provide revised elevation data for all items that have elevations shown on the plan drawings, including, but not limited to, the following:

   1. Manhole inverts (inlet and outlet)
   2. Manhole rims
   3. Lift station invert
   4. Lift station top
   5. Lift station pipe penetrations
   6. Float elevations
   7. Septic tank elevations
   8. Elevations of pipe entering and leaving structures
   9. Elevation of sewer service line stub (if terminated at right of way)
  10. Other elevations indicated on profiles.

E. Provide installed bid schedule items quantities for individual facilities on 8½ X 11 sheets.

   1. Engineer may supply standard forms for use by the Contractor.

3.02 WARRANTIES

A. Submit all warranty information regarding the materials installed.

B. Minimum warranty information is listed in Section 01430.
3.03 OPERATION AND MAINTENANCE INFORMATION

A. Submit all operation and maintenance information as included in the packaging from the manufacturer regarding the materials installed.

B. Additional project specific operation and maintenance requirements are listed in Section 01785.

END OF SECTION
<table>
<thead>
<tr>
<th>Item Description</th>
<th>Symbols</th>
<th>Materials</th>
<th>House Corner Ties (ft.)</th>
<th>Drawn By:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curb Stop</td>
<td>☯</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well</td>
<td>☰</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Septic Tank</td>
<td>☡</td>
<td>GAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combination Septic/Pump Tank</td>
<td>☥ ☥</td>
<td>GAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two Way Cleanout</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One Way Cleanout</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freezeless Riser</td>
<td>☥</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Service Line</td>
<td>● W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sewer Service Line</td>
<td>● S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drain Field</td>
<td>111112</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disposal System</td>
<td></td>
<td>DISPOSAL SYSTEM</td>
<td>TYPE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perforated Pipe</td>
<td></td>
<td></td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Sewer Force Main</td>
<td>● SFM</td>
<td></td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Insulation</td>
<td>☥ ☥ ☥ ☥</td>
<td></td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Buried Electrical Line</td>
<td>● E</td>
<td></td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Water Main</td>
<td>● W/M</td>
<td></td>
<td></td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Sewer Main</td>
<td>● S/M</td>
<td></td>
<td></td>
<td>NO</td>
<td></td>
</tr>
</tbody>
</table>

**Homeowner:**
**Project No:**
**Reservation:**
**Address:**
**Legal Description:**

**Drawn By:**
**Company:**

**Remarks:**

**Drawing No:** 01780-1
ITEM DESCRIPTION | SYMBOLS | MATERIALS | HOUSE CORNER TIES (FT.) | DRAWN BY: TLR
--- | --- | --- | --- | ---
CURB STOP | ☀ | | A | B | C | D | DATE: 02–16–06
WELL | ☎ | 6" STEEL | 1 | 33.2' | 74.1' | ABC COMPANY
SEPTIC TANK | ☎ | 1000 GAL CONCRETE | 1 | 35.0' | 35.0' | 52.0' | 52.0'
COMBINATION SEPTIC/PUMP TANK | ☎ | | | | | | REMARKS:
TWO WAY CLEANOUT | ☎ | 4" PVC | 1 | 30.7' | 30.9' | 31.2' | 31.5'
ONE WAY CLEANOUT | ☎ | | | | | | INSTALLED QUICK4
FREEZELESS RISER | ☎ | | | | | | STANDARD CHAMBERS
WATER SERVICE LINE | ☎ | W | | | | | 4 BEDROOM HOME
SEWER SERVICE LINE | ☎ | S | | | | | 4 BEDROOM HOME
DRAIN FIELD | ☎ | HDPE 42 | | | | | 4 BEDROOM HOME
DISPOSAL SYSTEM | ☎ | | | | | | FACILITIES INSTALLED IN FEBRUARY 2006
PERFORATED PIPE | ☎ | | | | | | TYPE: ☐ CONVENTIONAL ☐ IN-GROUND ☐ AT-GRADE
SEWER FORCE MAIN | ☎ | SFM | | | | | 4 BEDROOM HOME
INSULATION | ☎ | | | | | | MOUNT
BURIED ELECTRICAL LINE | ☎ | E | | | | | 4 BEDROOM HOME
WATER MAIN | ☎ | W/M | | | | | 4 BEDROOM HOME
SEWER MAIN | ☎ | S/M | | | | | 4 BEDROOM HOME

DIMENSIONS: 9" x 90'

DRAWING NO. 01780-2 (EXAMPLE)
SECTION 02310
GRADING

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes rough and finished site grading of all areas disturbed during construction.

1.02 RELATED WORK

A. Section 02315 – Excavation, Trenching and Backfill
B. Section 02370 – Temporary Erosion and Sediment Control
C. Section 02920 – Topsoiling, Seeding, Fertilizing and Mulching

PART 2 – PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.01 ROUGH GRADING

A. Grade the area in the vicinity of the excavation to prevent surface water from flowing into the excavation.

B. Maintain existing drainage.

3.02 FINISH GRADING

A. Grade site to true grades as specified on the plans after all structures and piping have been installed.

B. Grade sites for effective drainage away from structures.

C. Dress and trim all slopes.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. This section includes excavation, trenching and backfill necessary for the construction of the facilities as indicated on the plans including, but not limited to: water mains and service lines, sewer mains and service lines, concrete manholes, septic tanks, and other structures.

1.02 RELATED WORK (as applicable)

A. Section 01720 – Staking and Construction Surveying
B. Section 01780 – Closeout Submittals
C. Section 02310 – Grading
D. Section 02317 – Structural Fill
E. Section 02370 – Temporary Erosion And Sediment Control
F. Section 02511 – Water Service Lines
G. Section 02530 – Sanitary Sewer
H. Section 02532 – Sanitary Sewer Manholes
I. Section 02538 – Sewage Force Main
J. Section 02920 – Topsoiling, Seeding, Fertilization and Mulching

1.03 REFERENCES

A. Manual on Uniform Traffic Control Devices.
C. ASTM D2321 – Underground installation of Flexible Thermoplastic Sewer Pipe.
D. ASTM D2487 – Classification of Soils for Engineering Purposes [Unified Soil Classification System].
E. OSHA – Occupational Safety and Health Standards 1910 and 1926.

1.04 SUBMITTALS

A. Polystyrene Insulation
B. Polyethylene Encasement (as applicable)
1.05 DEFINITIONS

A. Bedding, Haunching and Initial Backfill zones as defined herein and on the standard pipe trench detailed drawing below:

PIPE TRENCH DETAIL

B. Soil Materials as summarized in the table below and defined in ASTM D2321 and ASTM D2487

<table>
<thead>
<tr>
<th>Description and Comparison of Soil Material Classifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASTM D2321</strong></td>
</tr>
<tr>
<td><strong>ASTM D2487</strong></td>
</tr>
<tr>
<td>Class</td>
</tr>
<tr>
<td>IA</td>
</tr>
<tr>
<td>IB</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Coarse sands and gravels with maximum particle size of 1 ½ inch, borderline clean. | GW-GC SP-SM Etc. | Sands and gravels which are borderline between clean and with fines
---|---|---
III | Fine sand and clayey gravels. | GM | Silty gravels, gravel-sand-silt mixtures.
| | GC | Clayey gravels, gravel-sand-clay mixtures.
| | SM | Silty sands, sand-silt mixtures.
| | SC | Clayey sands, sand-clay mixtures.
IV | Fine grained soils (inorganic) | ML | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity.
| | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
| | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
| | CH | Inorganic clays of high plasticity, fat clays.
V | Organic soils | OL | Organic silts and organic silty clays of low plasticity.
| | OH | Organic clays of medium to high plasticity, organic silts.
| | PT | Peat and other high organic soils.

* USCS system is limited to naturally occurring soils. Manufactured aggregates not covered.

**PART 2 – PRODUCTS**

2.01 BEDDING, HAUNCHING AND INITIAL BACKFILL MATERIAL

A. Class I, Class II or Class III, utilized in accordance with restrictions described in Part 3 - Execution.

2.02 INSULATION

A. Rigid extruded polystyrene insulation board, having a minimum compressive strength of 25 psi.

B. Width:

   1. 4-foot for mains 6-inch (nominal diameter) and larger.
   2. 2-foot for mains and service lines less than 6-inches (nominal diameter).

C. Thickness: As stipulated on the bid schedule.

2.03 POLYETHYLENE ENCASEMENT

D. Minimum 8 mils thickness.
PART 3 - EXECUTION

3.01 GENERAL

A. Trenching and excavation work shall be done in accordance with proper emphasis on safety as determined by the Contractor to conform to recommended safety standards such as OSHA 1910 and 1926.

B. Obtain all permits from appropriate road agency for construction within road right of way.

C. Repair damage resulting from settlement, slides, cave-ins, water pressure, and other causes.

D. Provide adequate signs, barricades, fences and amber lights and take all necessary precautions to protect the work and the safety of the public in all construction areas.
   1. Placement of construction signs and barricades shall conform to the “Manual on Uniform Traffic Control Devices.”
   2. Protect barricades and obstructions at night by amber signal lights that burn from sunset to sunrise. Barricades shall also be of substantial construction, painted white or with reflective paint to increase their visibility at night.
   3. Perform work without obstruction to traffic or inconvenience to the general public and the residents in the vicinity of the work.

E. Road Crossing

   1. Comply with all construction and material requirements of roadway authorities having jurisdiction.
   2. Maintain one lane of traffic open at all times.
   3. Refer to Section 02705 – Road Restoration for backfill and restoration requirements.

3.02 EXCAVATION

A. Remove trees and stumps from excavation and site.

B. Remove and stockpile existing topsoil.

C. Install facilities as staked unless otherwise approved by Engineer.
D. Maintain surface drainage away from trenching or excavation.

E. Remove unsuitable foundation materials from excavation as shown on the plans or as authorized by the Engineer.

F. Maintain a minimum 1-foot clearance between outer surface of structure being installed and wall of excavation.

G. Rock encountered shall be classified, excavated and measured in accordance with Section 02316 – Rock Excavation

3.03 TRENCHING

A. Bottom width: No less than 12 inches or more than 24 inches wider than the outside diameter of the pipe.

B. Depth: Provide minimum cover as specified, or depths shown on plans.

3.04 BEDDING

A. If existing soil cannot provide uniform, stable bearing support, over-excavate 6 inches below bottom of pipe or structure and provide bedding material.

B. Utilize Class I, II or III materials as appropriate for bedding as listed in Table below.

<table>
<thead>
<tr>
<th></th>
<th>Class IA</th>
<th>Class IB</th>
<th>Class II</th>
<th>Class III</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Excellent pipe support. Excellent drainage.</td>
<td>Excellent pipe support. Good drainage. Minimizes migration of adjacent material.</td>
<td>Good pipe support. Fair drainage.</td>
<td>Reasonable pipe support. Poor drainage</td>
</tr>
<tr>
<td>Compaction</td>
<td>Not required</td>
<td>Not required</td>
<td>Required 90% of Standard Proctor.</td>
<td>Required 90% of Standard Proctor.</td>
</tr>
<tr>
<td>Dry Conditions</td>
<td>Acceptable</td>
<td>Acceptable</td>
<td>Acceptable</td>
<td>Acceptable</td>
</tr>
</tbody>
</table>

3.05 HAUNCHING AND INITIAL BACKFILL

A. General

1. Provide complete and uniform bearing and support for the pipe, including allowance for bell holes, or structure.
2. Work material under and around the pipe to ensure full pipe support.

3. Prevent movement of the pipe during placement of material.

4. Avoid contact between the pipe and mechanical compaction equipment.

B. Utilize Class I, II or III materials as appropriate for haunching and initial backfill as listed in Table below. No frozen materials or frozen clods.

<table>
<thead>
<tr>
<th>Use of Soils and Aggregate for Haunching and Initial Backfill</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class I</strong></td>
</tr>
<tr>
<td>General</td>
</tr>
<tr>
<td>Compaction</td>
</tr>
<tr>
<td>Wet Conditions (below current or future water table). Rock Cuts</td>
</tr>
<tr>
<td>Dry Conditions</td>
</tr>
</tbody>
</table>

3.06 FINAL BACKFILL

A. Backfill remainder of excavation with native material, free from large clods, large stones, organic material or frost chunks unless otherwise specified below.

B. Backfill within roadways, driveways, and shoulders.

1. Conform to Section 02705 – Road Restoration for backfill requirements under roadways, driveways, and shoulders.

C. Backfill around structures.

1. Backfill and compact around manholes, valve boxes, and other appurtenances in 12-inch lifts.

   a. Compact with a mechanical tamper to a density not less than 90% of the maximum dry density, determined by ASTM D 698.
b. Compaction around structures in roadways, driveways, and shoulders shall conform to Section 02705.

2. Backfill around septic tanks in 18-inch lifts.
   a. Compact in a manner that will not produce undue strain on the tank.
   b. Compaction may be accomplished with the use of water, provided the material is thoroughly wetted from the bottom up, and the tank is filled with water to prevent floating.

D. Backfill of trenches and other locations not listed above.
   1. Compact in 18-inch lifts to a density not less than the density of the surrounding undisturbed soil.
   2. Provide 3 feet minimum of backfill over the pipe before wheel loading the trench.
   3. Provide 4 feet minimum cover over the top of the pipe before utilization of hydrohammer compaction equipment.
   4. Compact in smaller lifts if the required compaction cannot be obtained.
   5. Lifts may be increased at the discretion of the Project Engineer if required compaction can be obtained.

E. Repair any trenches improperly backfilled or where settlement occurs, then refill and compact.

F. Restore surface to the required grade and compaction. Conform to Section 02310 – Grading for rough grading, finish grading and site surface drainage.

G. Remove all surplus backfill materials to a location approved by the Engineer.

3.07 FROST PROTECTION

A. Place insulation in areas where water main, sewer service lines or water service lines cross a road, driveway, traveled path, as indicated on the plans or as directed by the Engineer.

B. Center insulation over the main with no more than 6 inches of compacted fill between the pipe and the insulation. Grade fill so insulation lays flat.

C. Maintain a straight alignment of insulation.
D. Extend insulation a minimum of 5 feet on each side of the crossing.

E. Lap insulation by 6 inches or stagger by 6 inches if composed of two layers.

F. Minimum thickness for the first lift of backfill over the insulation is 8 inches.
   1. Do not operate construction equipment directly on insulation. Do not compact first lift with backhoe-mounted compactor, or any other large compaction equipment.
   2. Compact remaining backfill using normal construction practices.

3.08 POLYETHYLENE ENCASEMENT

A. All metallic mainline pipe, fittings, and appurtenances installed in aggressive soils shall be wrapped with polyethylene in accordance with ANSI/AWWA C105/A21.5.

B. The wrap shall extend 2-feet beyond all metallic fittings/appurtenances and cover the entire length of metallic pipe. All rips or punctures shall be repaired with tape or by rewrapping that area with polyethylene film.

C. After assembling the pipe joint, the polyethylene shall be overlapped approximately 1-foot and at all joints sealed with approved adhesive tape. Additional taping shall be used at 3-foot intervals along the pipe. All copper service connections shall be wrapped for a distance of 3-feet from the center line of the main. Before installing the polyethylene wrap, the exterior of the pipe shall be free of foreign material.

3.09 REMOVAL OF NUISANCE WATER

A. Remove nuisance water entering the trenches. Nuisance water that can be removed through the use of sump or trash pumps is not considered dewatering.

B. Keep trenches free from water until the facilities are in place, sealed against the entrance of water, and backfill has been placed and compacted above the water level.

3.10 LOCATE EXISTING UTILITIES

A. Field locate all existing underground utilities.
   1. Utilize state “dig-safe” or “one-call” hotlines.
2. Contact all other utility owners not covered by the state “dig safe” hotlines.

3.11 UTILITY CONFLICTS

A. Protect existing utilities from damage during excavation and backfilling operations.

B. Provide temporary support for existing water, gas, telephone, power, or other utility services that cross the trench until backfilling of trench is complete

1. Compact backfill to 95% of Standard Proctor Density under disturbed utilities.

2. Repair or replace any damaged existing utilities, at no additional cost to the project.

C. Water and sewer main crossing and parallel installation

1. Maintain a 10 foot horizontal separation (O.D. to O.D.) for parallel mains.

2. Upon approval by the Engineer, water and sewer mains may be installed closer than 10 feet, provided all of the following conditions;

   a. Vertical separation is 18 inches (O.D. to O.D.)
   b. Water main is above the sewer main.
   c. Separate trenches are maintained.

3. Maintain a minimum 18-inch vertical separation (O.D. to O.D.) for crossing mains.

   a. Lay pipe with joints equidistant from the point of crossing.

4. If it is impossible to meet any of the above separation distances and deviations, one of the following methods shall be adhered to.

   a. Sewer main shall be constructed to water main pressure pipe standards, and successfully pass a 150-psi pressure test prior to backfilling.

   b. Either the water main or the sewer main may be encased in a watertight carrier pipe that extends 10 feet on both sides of the crossing. The carrier pipe shall be of materials approved by the regulatory agency for use in water main construction.

D. Water and sewer service crossing and parallel installation.
1. Maintain a 30-inch horizontal separation from water and sewer services.

2. Maintain a 12-inch vertical separation for crossing water and sewer services.

3. Water service line splices or joints will not be permitted within 10 feet of a sewer line crossing.

3.12 MOVING FENCES AND MINOR STRUCTURES

A. Remove and reset culverts, drainage pipes or other minor structures that fall within the alignment of the new construction, to their original location and grade.

B. Visit the project site and determine actual conditions with regard to the existence of old car bodies, abandoned houses, fences, driveways, trees, stumps, brush, sidewalks, approaches, and other miscellaneous obstacles to construction.

1. Unless specifically referenced in a bid item, no separate payment will be made for the removal or replacement of these items.

3.13 RECORDS

A. Conform to as-built requirements in Section 01780 – Closeout Submittals.

END OF SECTION
PART 1 - GENERAL

1.01 SUMMARY

A. This section includes construction of drainfield and drainbed systems.

1.02 RELATED WORK (as applicable)

A. Section 01780 – Closeout Submittals
B. Section 02545 – Concrete Septic Tank and Piping

1.03 REFERENCES

A. ASTM D 1785 – Polyvinyl Chloride (PVC) Plastic Pipe Schedule 40, 80 and 120
B. ASTM D 2729 – Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
C. ASTM D 2751 – Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings
D. ASTM D 3034 – Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
E. Minnesota Pollution Control Agency, Chapter 7080 – Individual Sewage Treatment Systems

1.04 SUBMITTALS

A. Solid Pipe
B. Perforated Pipe
C. Source of Gravel
D. Synthetic Gravel Covering
E. Drop Boxes (if required)
F. Gravelless Drainfield Distribution Media
1.05 QUALITY ASSURANCE

A. Excavation or construction of drainfields will not be allowed when the moisture content of the soil is greater than the plastic limit or when the occurrence of rain, snow or frost is such that the quality of construction may be impaired.

B. Drainfield materials shall meet minimum requirements of the appropriate state and local regulations.

   1. In Minnesota, materials shall meet the requirements of the Minnesota Pollution Control Agency, Chapter 7080 – Individual Sewage Treatment Systems.

PART 2 - PRODUCTS

2.01 SOLID SEWER PIPE AND FITTINGS

A. Schedule 40 PVC pipe shall conform to ASTM D 1785.

B. SDR 35 PVC pipe and fittings shall conform to ASTM D 3034.

2.02 PERFORATED PIPE

A. Perforated pipe may be PVC pipe conforming to ASTM D 2729 or ASTM 3034.

B. Strength reduction is allowed for perforations.

2.03 SYNTHETIC GRAVEL COVER

A. Synthetic material shall be TYPAR Style 3151 or approved equal.

2.04 GRAVEL

A. Gravel shall be clean and may vary in size from 1/2 to 1-1/2 inch, with not more than 5 percent fines below the 1/2-inch size.

2.05 DROP BOX

A. Construct drop boxes and drop box lids of concrete or injection molded HDPE.

B. Box shall be supplied with a 4-inch inlet, outlet and two outlets for trenches.

C. All outlets shall be one inch lower than the inlet.

D. Provide a rotating elbow on the outlet.
2.06 GRAVELLESS DRAINFIELD DISTRIBUTION MEDIA

A. General

1. All Gravelless Drainfield Distribution Media is subject to Approval by the Engineer on a case by case basis.
2. Drainfield dimensional reductions are subject to Engineer Approval.
3. Media shall be approved by the appropriate State regulatory agency.
4. The following Media have been approved for use.
   a. Infiltrators Systems Inc, Quick 4 Standard Chambers
   b. Infiltrators Systems Inc, Quick 4 Plus Standard Low Profile (LP) Chambers
   c. Infiltrators Systems Inc, EZ Flow Systems

B. Concrete splash pad: 2 inches x 8 inches x 16 inches for chambers.

2.07 OBSERVATION PIPE

A. Observation pipe material shall be either cast iron pipe or Schedule 40 PVC.

B. Cap shall be non-vented plastic in Minnesota

2.08 SANITARY PERMITS

A. Permit for construction on a Wisconsin taxable site that falls under the county and/or state jurisdiction.

2.09 SEPTIC DESIGNS

A. Design for septic systems on a Wisconsin taxable site that falls under the county and/or state jurisdiction.

PART 3 - EXECUTION

3.01 GENERAL

A. Construct drainfield/ drainbed in accordance with Engineer’s design.

B. Contractor’s option to install gravelless drainfield chambers instead of perforated pipe and gravel systems.

C. Width of drainfield/ chamber trenches to be specified on the bid schedule.

D. Install septic system in location shown on the site plan, in the location of the soil test, and as directed by the Engineer.
3.02 SOLID SEWER PIPE

A. Install SDR 35 solid sewer pipe from the Schedule 40 PVC outlet stub at the septic tank to the beginning of the drainfield.

B. Minimum cover over solid sewer pipe is 12 inches.

C. Solid sewer pipe from septic tank outlet to drainfield shall have a minimum drop of 6 inches or 1/8-inch per foot slope, whichever is greater.

D. Solvent weld all joint connections.

E. Insulation will be required in traveled areas as specified by the Engineer.

3.03 DRAINFIELD AND DRAINBED

A. Rake to a depth of 1-inch all smeared or compacted surfaces of sidewalls and remove loose material before gravel is placed.

B. Place gravel the full width of the trench or bed and lay perforated pipe level.

C. Gravel shall be 2 inches above the pipe and 6 inches below the pipe.

D. Cover the top of the gravel with synthetic material.

E. Backfill trench or bed to a depth of 3 to 6 inches above existing grade.

F. Install vertically a piece of No. 3 rebar, 1-foot in length, above the piping at the four corners of the drainfield. Bury rebar 6 inches below ground surface.

G. Leave each premise in a neat and orderly condition, restoring it as near as possible to its original condition and to the approval of the Engineer.

3.04 GRAVELLESS DRAINFIELD DISTRIBUTION MEDIA

A. Excavate to the width required for the media being used.

B. Level trench to specified elevation.

C. Rake to a depth of 1 inch all smeared or compacted surfaces of sidewalls.

D. Remove loose material before placing the media in the trench.

E. Place media in the trench and connect.

1. Connect in accordance with manufacturer’s installation instructions.
F. Install observation pipe on each gravelless drainfield lateral end.
   1. Chambers: Insert inspection pipe through 4-inch punch-out hole on top of the end drainfield chamber.
   2. EZ Flow: Install in accordance with 3.05.

G. Chambers:
   1. Install header pipe level.
   2. Insert inlet pipe 1 inch and secure with self-tapping screw to the end cap. Place 2 concrete splash pads side by side on bottom of trench directly under the inlet pipe to control erosion.

H. EZ Flow:
   1. Install level in accordance with approved design and/or permit.
   2. For EZ Flow Geo Systems install so fabric is on top and is in contact with the fabric from the adjacent bundle per the manufacturer’s recommendations.
   3. The EZ Flow EPS Aggregate bundles not containing GEO must be covered with 36” to 48” wide non-woven geotextile or other approved barrier materials per the manufacture’s recommendations.

I. Install 1 metal marker at each corner of the drainfield area at 12 inches from the centerline of the piping or the centerline of the drainfield chamber.

J. Backfill trench
   1. Minimum fill depth: 12 inches
   2. Maximum fill depth: 36 inches

K. Mound 3-6 inches (above existing ground surface) of native material over absorption trench.

3.05 OBSERVATION PIPE

A. Install on each drainfield dead end line or if drainfield lines are connected together, the observation pipes shall be located at the two far end corners from the home.

B. Construct as shown on the standard detail drawings with a vented cap.

C. The observation pipe shall extend from the bottom of the trench to a height of 12 to 24 inches above grade.
3.06 DROP BOXES

A. Install drop boxes in locations where steep slopes require that the drainfield laterals be terraced and as directed by the Engineer.

3.07 SANITARY PERMIT AND SEPTIC DESIGN

A. Obtain permit and construct drainfield in accordance in county and state regulations and permit requirements.

B. Provide IHS with a copy of the sanitary permit and record drawings.

C. Non-IHS Soil Test
   2. Provide all equipment necessary to complete soil test including excavator.
   3. Contact Digger’s Hotline prior to excavation.
   4. Complete soil test in accordance with State requirements on sites designated by the Project Engineer.
   5. Provide clean typed copy of soil test with site drawing, soil boring locations, elevations, and elevation contours to the project engineer. In addition to elevations required by State, provide three (3) elevation shots of ground in vicinity of proposed home.

D. Septic Designs on Wisconsin Taxable Sites
   1. Design in accordance with Wisconsin Dept. of Commerce Chapter Comm 83.
   2. Provide copy of design to Project Engineer for approval prior to construction.
   3. Construct septic system in accordance with the approved design.
   4. Obtain Sanitary Permit where applicable

3.07 AS-BUILTS

A. Provide as-built information on each system in accordance with Section 01780. Use IHS forms (if supplied) by the Engineer.
4" SOLID SEWER PIPE SHOULD HAVE 1/8" PER FOOT MIN. SLOPE OR 6" MIN. DROP

SEPTIC TANK

10' MIN.
5' APPROX.

TWO WAY CLEANOUTS

4" PERFORATED PIPE (LAID LEVEL)

LOCATION OF FIELD STAKED BY I.H.S. INSPECTORS

#3 REBAR - 12" LONG = •

1.5' MIN.
3' MAX.

LENGTH L

A

OBSERVATION PIPES

S

NOTE:

1. DESIGN OF DRAINFIELD TO BE DETERMINED BY I.H.S. ENGINEER
2. GRAVEL-LESS CHAMBER SYSTEM IS ACCEPTABLE PER SPECS.

SECURE PLASTIC PIPE

12"-24"

CAST IRON OR P.V.C.

PERF. PIPE EXTENDS TO BOTTOM OF ROCK

OBSERVATION PIPE DETAIL (N.T.S.)

TOP SOIL

EARTH BACKFILL

SYNTHETIC FABRIC

4" PERFORATED PIPE

GRAVEL DRAINFIELD

INVERT ELEVATION

SYSTEM ELEVATION

6"

SECTION A-A (N.T.S.)

NO. OF LATERALS: AS SPECIFIED BY ENGINEER

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

TYPICAL DRAINFIELD LAYOUT

FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 68-121

DRAWN BY: L.A.F.
CHK'D BY: S.M.H.
REV. DATE: 05/09/00
REV. DATE: 05/09/00
DRAWING NO. 02540-1
1 OF 1
PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the installation and construction of an individual waste disposal system composed of a pump chamber, pump, controls, piping and a mound disposal system.

1.02 RELATED WORK (as applicable)

A. Section 01119 – Revisions to Standard Specifications
B. Section 01780 – Closeout Submittals
C. Section 02315 – Excavation, Trenching and Backfill
D. Section 02545 – Concrete Septic Tank and Piping

1.03 REFERENCES

A. ASTM D1785 – Polyvinyl Chloride (PVC) Plastic Pipe Schedule 40, 80 and 120.
B. ASTM D2241 – Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)
C. ASTM C33 – Standard Specification for Concrete Aggregates
D. National Electric Code (NEC)

1.04 SUBMITTALS

A. Pump Chamber, Riser and Cover
B. Effluent Pump, Controls and Alarm System
C. Force Main, Manifold, and Lateral Piping
D. Source of Mound Material and Distribution Media, Drainfield Gravel and Sieve Analysis for Clean Sand
E. Synthetic Gravel Cover

PART 2 - PRODUCTS

2.01 CONCRETE PUMP CHAMBER
A. Fabricate from watertight reinforced concrete as shown on the attached drawings.

B. Comply with applicable state requirements. Refer to Section 02545 for appropriate state references.

C. Volume of container is listed in the bid schedule.

D. Combination septic tank/ pump tanks are acceptable, provided they meet applicable state requirements. Refer to Section 02545 for septic tank requirements.

E. Manhole risers and covers

   1. Provide at least one manhole opening, no less than 24 inches square or 24 inches in diameter, situated over the pump.

   2. Manhole riser shall be cast in place polyethylene with gasketed connections or other approved water-tight material. Extend riser 6-inches above finished grade.

   3. Covers shall be of the same material as the riser, with a warning label, printed with information regarding the hazards present when entering a septic tank affixed or supplied by the manufacturer. Cover shall be secured to the riser with locking screws or approved equal.

2.02 PUMPS AND CONTROLS

A. Effluent Pump Requirements

   1. 1/2 horsepower, 115/230 volt, single phase submersible, 2 inch discharge outlet, capacity of 50 gpm against a total dynamic head of 20 feet unless specified otherwise in Section 01119.

   2. Equal to Peabody Barnes Model EH522, Myers Model ME 50, Goulds Model 3885 or Zoeller 270.

B. The Engineer shall determine the type and size of pump to be used.

C. The pump motor shall have a built-in thermal overload protection with automatic reset.

D. Use two mechanical float switches to detect on-off control levels for the pump.

   I. Use SJE Rhombus Signal Master Control Switch or equal).
E. Power Supply Requirements: 120/240 volt, single phase, three wire service from one/two pole breaker off lighting panel in the residence on a separate/dedicated circuit.

   1. Use wire sized in accordance with NEC.

F. Controls: Furnish and install controls to operate the pump based on on-off level control floats.

   1. Option #1: A control panel compatible with the pump supplied and housed in a weatherproof enclosure equal to a NEMA Type 4X fiberglass enclosure.

      a. Provide terminal blocks for connection of on-off level control floats.

      b. A separate dead front enclosure section shall house a load switching motor contactor with door mounted heavy-duty hand-off-auto switch and a service disconnect mechanism.

      c. Equal to Rhombus Inc., Model 1120W115H1E10E11C17A, phone (888) 342-5753 or approved equal

   2. Option #2: Pump Switch with Piggy-Back Plug and outlet rated for exterior use and housed in a weatherproof enclosure equal to a NEMA Type 4X fiberglass enclosure.

      a. Size pump switch to be compatible with selected pump (ie voltage and horsepower rating)

      b. Enclosure area shall be a minimum of 1.5 times the area of the piggyback switch, outlet, and folded cables to allow for easy access, removal, and replacement of switch, outlet, and cables.

      c. Size power cable in accordance with the NEC.

      d. Equal to Rhombus Inc, Double Float pump switch.

   3. Provide terminal blocks for connection of on-off level control floats.

   4. A separate dead front enclosure section shall house a load switching motor contactor with door mounted heavy-duty hand-off-auto switch and a service disconnect mechanism.

G. Provide an alarm system on a separate circuit from the pump.
1. Alarm system shall consist of a direct acting mechanical float switch, 24-volt control transformer, red alarm light, horn, push-to-test alarm button and a horn silence switch.
   
a. Alarm light and horn shall activate when alarm float circuit is closed.
   
b. The horn shall continue to sound until reset manually by a button located on the alarm panel.
   
c. The alarm light shall continue to operate until the alarm circuit has been opened, the operating condition has returned to normal, and the silencing switch has been returned to its “normal” position.

2. Option 1: Indoor alarm system shall be Powertronics Model MD 3875, Rhombus Model 101-01H (Tank Alert 1) or approved equal.

3. Option 2: Outdoor alarm on the control panel is Contractor’s option. Rhombus Control panel Model #1121W111H10E or approved equal.

2.03 ELECTRICAL CABLE

   A. Electrical cable shall be type UF for direct burial.
   
   B. Use 12/2 wire with ground to provide power to the effluent pump.
   
   C. Use 14/2 wire to provide power to the float switches.
   
   D. Size underground cable to limit voltage drop from power source to pump motor in accordance with pump manufacturer’s recommendations.

2.04 FORCE MAIN AND MOUND PIPING

   A. Force main piping shall be PVC (160 psi SDR 26 or Schedule 40) or PE 3408/4710. The diameter and standard design ratio (SDR) shall be as indicated on the design drawings.
   
   B. PVC to PE force main transition (if applicable) shall be CTS to PVC compression fitting equal to A.Y. McDonald fitting 74758-22-44.
   
   C. Manifold pipe shall be PVC (160 psi SDR 26 or Schedule 40). The diameter shall be as indicated on the design drawings.
   
   D. Perforated pipe shall be PVC (160 psi SDR 26 or Schedule 40). The pipe shall be field perforated. The pipe diameter shall be as indicated on the design drawings.
E. Observation pipes shall be 4-inch solid cast iron pipe or Schedule 40 PVC.

2.05 MOUND MATERIAL AND DISTRIBUTION MEDIA

A. Clean sand shall meet the following requirements for fine aggregate (ASTM C33):

<table>
<thead>
<tr>
<th>Sieve No.</th>
<th>Percent Finer by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch</td>
<td>100%</td>
</tr>
<tr>
<td>No. 4</td>
<td>95-100%</td>
</tr>
<tr>
<td>No. 8</td>
<td>80-100%</td>
</tr>
<tr>
<td>No. 16</td>
<td>50-85%</td>
</tr>
<tr>
<td>No. 30</td>
<td>25-60%</td>
</tr>
<tr>
<td>No. 50</td>
<td>10-30%</td>
</tr>
<tr>
<td>No. 100</td>
<td>2-10%</td>
</tr>
<tr>
<td>No. 200</td>
<td>0-3%</td>
</tr>
</tbody>
</table>

B. Distribution Media Options:

1. Drainfield Gravel: Gravel shall be clean and may vary in size from ½-inch to 2 inches, with not more than 5 percent fines below the ½-inch size.

2. Infiltrators Systems Inc, Quick 4 Standard Chambers or approved equal.

3. Infiltrators Systems Inc, EZ Flow Systems or approved equal.

C. Synthetic material shall be TYPAR Style 3151 or equal.

D. Cover material shall be a soil that allows for air exchange while promoting plant growth. Clays or glacial till, with stones and boulders shall not be used.

E. The seed mixture shall be recommended by a local agricultural extension agent and shall be approved by the Engineer.

PART 3 - EXECUTION

3.01 CONCRETE PUMP CHAMBER AND PUMP

A. Install 4-inch Schedule 40 PVC from the septic tank to the pump chamber.

B. Seal all joints between inlet piping, vent pipe, riser, etc. to eliminate ground water infiltration, as approved by the Engineer.

C. Install vent on pump chamber in accordance with state codes.
D. Install all buried electrical cable (1 pump wire and 3 float switch wires) in one trench.

E. Floats:
   1. Mount floats in pump chamber as directed by Engineer.

3.02 CONTROL PANEL AND ALARM SYSTEM

A. Install all wiring in accordance with the NEC.

B. Mount control panel in a location specified by the Engineer.

C. Seal all conduit openings entering the control panel and pump chamber with silicone caulk or other appropriate material.

D. Install the alarm system in the residence in a location to be selected by the Engineer and homeowner.
   1. Install the alarm system on a separate circuit from the pump.
   2. Set up the alarm so that upon the occurrence of an alarm condition, the high alarm sensor will close its circuit, thus energizing the red alarm light and sounding the horn.
   3. Provide a switch that when moved from the “normal” to “silence” position will silence the audible alarm, and allow the red alarm light to remain energized.
   4. The high alarm sensor shall continue to show an alarm condition until the operating condition has returned to normal and the silencing switch has been returned to its “normal” position.

3.03 FORCE MAIN, MANIFOLD, AND LATERAL MOUND PIPING

A. Install force main piping and union in the pump chamber, as shown in the detail drawings, to allow the removal of the pump through the riser by only disconnecting the union.
   1. Union shall be a maximum of 24 inches below top of tank riser.

B. Alternative discharge piping layout: exit through the pump tank opening.
   1. Discharge piping shall be brought up into the riser so that the union is within 24 inches of the top of the tank riser.
2. Drill a 1/4-inch weep hole in the bottom elbow of the outlet pipe.

C. PVC to PE Force Main Transition (if applicable):

1. Transition from PVC to PE force main outside pump tank with compression fitting.

2. Transition from PE force main to PVC mound distribution piping with compression fitting at lateral or header (if multiple laterals).

D. Slope the pipe continuously up to the mound unless otherwise directed by the Engineer.

E. Trench force main pipe up to the mound area and slope into the mound within the fill from the upslope side or the end of the mound per the design drawings.

F. Mound Distribution Piping:

1. Install piping per design completed and/or approved by the Engineer and as shown in the drawings.
2. Field perforate lateral piping per approved plan using sharp drill bit.
3. Remove all burrs and filings from the interior of the pipe.
4. Extend the end of each lateral up using use of long turn or 45-degree fitting to a point within six inches of final grade.
5. Terminate the end of each lateral with a threaded plug unless otherwise directed in section 01119.
6. Install protective enclosure over each turn up to allow allows access from final grade.

G. Refer to Section 02315 for excavation and backfilling procedures.

3.04 MOUND SURFACE PREPARATION

A. Approval for surface preparation shall be obtained from the Engineer.

B. If tree removal is required, cut trees flush with the ground and remove. Leave stumps in the ground.

C. Remove excessive vegetation from the mound area by clearing and mowing.

D. Plow, with a chisel type plow, perpendicular to the slope.

E. Scratching of the surface by a backhoe may be allowed with approval of the Engineer.

F. Obtain a minimum plowing depth of 7 to 8 inches below original grade.
3.05 MOUND CONSTRUCTION

A. Application of mound basal sand must be completed immediately after surface plowing has been accomplished.

B. Place a minimum of 12 inches of clean sand upon plowed surface, below drainfield gravel.

C. Place sand by dumping along the upslope side and/or ends of the plowed area.

D. Use a crawler tractor with a blade to spread the sand, keeping at least 6 inches of sand under the tracks at all times.

E. Distribution Media Construction:

1. Drainfield Gravel: Install drainfield gravel approved by the Engineer and as shown on the detail drawings.

2. Manufactured Media: Install media approved by the Engineer and as shown on the detail drawings.

F. Refer to 3.03 for manifold and lateral piping installation requirements.

G. Install observation pipes at locations shown on design drawings so that the bottoms of the observation pipes are flush with the infiltrative surface of the mound (gravel/sand interface).

H. Observation pipes shall be constructed per the detail drawing, fitted with a secure state approved cover, and extended 12 to 24 inches above grade.

I. Cover drainfield gravel with synthetic material as shown in detail drawings.

J. Place cover material above the drainfield gravel as shown on the detail drawings.

1. The cover material layer shall be a minimum of 12 inches deep at the center of the mound and a minimum of 6 inches deep at the sides.

K. Seed and mulch entire mound area to provide immediate erosion control as recommended by a local agricultural extension agent.

L. Repairing erosion damage and re-seeding the mound area is required until a complete vegetation cover is achieved.
3.06 FIELD QUALITY CONTROL

A. No plowing shall take place when the moisture content of the soil, at a depth of 7 to 8 inches, is such that rolling a sample between the hands forms a roll.

B. The Engineer reserves the right to conduct a field test of mound sand and reject the aforesaid sand should it fail to meet the gradation requirements.

C. No rubber tired or wheeled equipment or material stockpiles will be allowed on the mound basal area and/or the designated down-slope area.

3.07 AS-BUILTS

A. Provide as-built information on each system in accordance with Section 01780. Use IHS forms (if supplied) by the Engineer.

END OF SECTION
NOTES:
1.) FLOAT SETTINGS TO BE SPECIFIED BY THE PROJECT ENGINEER.
2.) DISTANCE FROM ELBOW TO THE TOP OF THE RISER IS A MAX. OF 24" OR OPTIONAL PIPING SHALL BE USED.
SECTION 02545
CONCRETE SEPTIC TANK AND PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. This section covers single and multiple compartment, rectangular and cylindrical precast septic tanks. Also included is the piping from the home to the septic tanks along with two-way cleanouts and septic tank abandonment.

1.02 RELATED WORK (as applicable)

A. Section 01119 – Revisions to Standard Specifications
B. Section 01780 – Closeout Submittals
C. Section 02315 – Excavation, Trenching and Backfill
D. Section 02540 – Drainfields
E. Section 02541 – Pressure Dosed Mound System (Minnesota)
F. Section 02542 – Pressure Dosed Mound System (Michigan and Wisconsin)

1.03 REFERENCES

A. ASTM D 1785 – Polyvinyl Chloride (PVC) Plastic Pipe Schedule 40, 80 and 120.
B. ASTM D 3034 – Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
C. Minnesota Pollution Control Agency, Chapter 7080 – Individual Sewage Treatment Systems
E. State of Michigan, Western Upper Peninsula District Health Department, Superior Environmental Health Code.

1.04 SUBMITTALS

A. Septic tank (including wire mesh detail or manufacturers literature on fibers)
B. Septic tank riser and cover.
C. Effluent Filter
D. Solid sewer pipe
E. Cleanout and Inspection plug

1.05 QUALITY ASSURANCE

A. Septic tanks and other materials shall meet minimum requirements of the appropriate state agency regulating onsite septic systems.

PART 2 - PRODUCTS

2.01 SEPTIC TANKS

A. Septic Tank Requirements

1. Min. reinforced concrete wall thickness 2 inches
2. Minimum capacity below outlet 1,000 gallons, or as specified on the bid schedule
3. Minimum liquid depth 2 1/2 feet
4. Maximum liquid depth 5 1/2 feet
5. Concrete compressive strength 3,000 psi

B. Rectangular tanks shall have a minimum width of 36 inches and be constructed with the longest dimension parallel to the direction of flow.

C. Reinforce throughout with 6-inch x 6-inch – 10/10 wire mesh or fiber mesh.

D. Cylindrical tanks shall have an inside diameter of not less than 48 inches.

E. Joints below the liquid level shall be of monolithic construction or have interlocking V-notch, shiplap or tongue and groove joints.

F. Inlet and Outlet

1. Provide tanks with inlet and outlet connections for 4-inch Schedule 40 PVC.
2. Provide rubber boots on all inlet and outlet openings to prevent the insertion of the sewer piping beyond the inside wall of the tank.
3. Provided an open-end coated sanitary tees or baffles made of approved materials at the inlet.
4. Tees or baffles shall extend at least 6 inches above and 9 inches below the liquid level, but not exceed 1/3 of the liquid depth.
5. Provide at least 2 inches of clear space over the top of tees or baffles.
6. The bottom of the outlet opening shall be at least 2 inches lower than the bottom of the inlet.

G. Manhole Risers and Covers

1. Provide at least two manhole openings, no less than 24 inches square or 24 inches in diameter, with each single or multiple compartment tanks, situated over the inlet pipe & baffle and outlet pipe & effluent filter.

2. Manhole riser shall be cast in place polyethylene with gasketed connections or other approved water-tight material.

3. Covers shall be of the same material as the riser, with a warning label, printed with information regarding the hazards present when entering a septic tank affixed or supplied by the manufacturer.

2.02 SOLID SEWER PIPE, CLEANOUT AND FITTINGS

A. Schedule 40 PVC fittings and caps shall conform to ASTM D 1785.

B. SDR 35 PVC pipe and fittings shall conform to ASTM D 3034.

C. Cleanout piping and cap shall be PVC and threaded if installed above ground. Plug shall be cast iron and threaded if installed below ground.

D. Frost Sleeve (WI and MI only)

1. Schedule 40 PVC or SDR 35 PVC
2. Cap: Slip on or threaded
3. Diameter: 2-inches bigger than cleanout diameter
4. Minimum length: from ground surface to elbow

2.03 EFFLUENT FILTER

A. Rated for 3,000 gpd flow rate.

B. Maximum filter opening, 1/16 inch.

C. Equal to Polylok PL-525 or Zabel A100 (12 x 20 inches).

2.04 PIPE HANGERS

A. Shall be made of a material compatible with piping material.

B. Shall be of sufficient strength to support the pipe at full capacity.
C. Shall not affect pipe integrity by either abrading, cutting or bending of pipe.

PART 3 - EXECUTION

3.01 SOLID SEWER PIPE and CLEANOUTS

A. Install solid sewer pipe from the house to the septic tank.
   1. Connect to the existing home sewer stub out if present underground outside the home.
   2. For connecting beneath the home, place pipe hangers at a maximum distance of 4 feet apart for horizontal PVC pipe.
   3. Cap sewer service, and stake if no connection is made.
   4. Install a frost sleeve for the vertical service line connection beneath the home from 2" above grade to within 6" of the top of the below ground horizontal sewer service line for a mobile home connection.

B. Minimum cover over solid sewer pipe is 12-inches.

C. Insert inlet piping to be at least 6 inches, but no more than 12-inches from baffle.

D. Schedule 40 PVC pipe shall extend from the septic tank inlet and outlet a minimum of 12-inches past the edges of the tank excavation.

E. Minimum slope between the house and the septic tank is 1/8-inch per foot or 6 inches, which ever is greater.

F. There shall be no 90-degree bends in the pipe between the house and the Septic tank.

G. Install two-way cleanouts approximately 5 feet from the outside wall of each home or mobile home.
   1. Cleanout shall allow rodding the sewer line both towards the home and towards the septic tank.
   2. Fit cleanout with a threaded plug.
   3. Install cleanout so the top is flush with the ground or as specified by the Engineer.
   4. Install frost sleeve around each cleanout riser.
5. Install vertically a piece of No. 3 rebar, 1-foot in length, next to each cleanout riser. Bury rebar 6 inches below ground surface.

H. Properly seal pipe connections to tanks to prevent groundwater infiltration.

I. Terminate inspection opening 6 inches above final grade and securely cap.

J. Solvent weld all joint connections.

K. Install insulation in traveled areas as specified by the Engineer in accordance with Section 02315 – Excavation, Trenching and Backfill.

3.02 TANK INSTALLATION

A. Place tanks in excavations at the locations and elevations designated on the plans or by the Engineer.

B. Refer to Section 02315 for excavation, backfill, and grading requirements.

C. Place tanks level.

D. Install tanks in accordance with manufacturer’s recommendations.

E. Seal joints when the tank is set with an epoxy based sealing compound or Rub-R-Nek flexible gasket, as manufactured by the Henry Group (formerly K.T. Snyder Company Inc.), Houston, Texas, or equal.

F. Seal inlet and outlet with temporary plugs until connections are made to the inlet and outlet lines.

G. Set the top of the tank a minimum of 6-inches below finished grade. Do not exceed 24-inch cover depth unless tank is designed for deeper bury depth and Engineer approves.

   1. Install manhole risers and terminate access cover 3-6-inches above finished grade. Provide suitable locking screws or locking device that meets with Engineer’s approval.

   2. Where manhole risers are required more to be than 24 inches in height, risers and manhole shall be made of concrete with approved watertight seals.

H. Do not drive over the tank during and after construction.

3.03 EFFLUENT FILTER
A. Center filter under the outlet manhole opening.

B. Solvent weld to 4-inch PVC Schedule 40 outlet pipe. Extend a minimum of 12-inches beyond the outside of the septic tank before connecting to SDR 35 pipe.

C. Install filter handle and extend handle to within 6-inches of the top of the access riser for easy access.

D. Conform to manufacturer’s installation instructions.

3.04 EXISTING SEPTIC TANK ABANDONMENT

A. Abandon existing septic tanks and/or wet wells where directed by the Engineer.

B. Pump tanks prior to abandonment. Dispose the contents in accordance with state and federal requirements.

C. Remove and dispose of any interior pipes, plumbing, or pumps.

D. Remove and dispose of concrete tank cover, risers, and inspection pipes.

E. Backfill interior of the tank with suitable, compactable soil material.

F. Conform to section 02310 – Grading, and section 02920 – Topsoiling, Seeding, Fertilizing and Mulching.

G. Locate abandoned septic tanks on the as-built drawing.

3.05 AS–BUILTS

A. Provide as-built information on each system in accordance with Section 01780.

END OF SECTION
NOTE:

1. TANK TO BE REINFORCED THROUGHOUT WITH 6" X 6"-10/10 WIRE MESH OR FIBER MESH AS PER SPEC. PLACE #3 REBAR ACROSS THE TOP IN BOTH DIRECTIONS AT EACH CORNER AS SHOWN AND IN THE MANHOLE COVER.

2. INLET BAFFLE OR TEE REQUIRED PER SPEC'S.

3. OUTLET IS A MINIMUM OF 2" BELOW INLET.

4. 1000 GALLON MINIMUM CAPACITY, OR AS SPECIFIED ON THE BID SCHEDULE.
4" SOLID SEWER PIPE SHOULD HAVE 1/8" PER FOOT MIN. SLOPE OR 6" MIN. DROP

12" OF SCH.40 AT OUTLET

SEPTIC TANK

10' MIN.

5' APPROX.

TWO WAY CLEANOUTS

4" PERFORATED PIPE (LAID LEVEL)

LOCATION OF FIELD STAKED BY I.H.S. INSPECTORS

#3 REBAR - 12" LONG = ●

HOUSE

NOTE: DESIGN OF DRAINFIELD TO BE DETERMINED BY I.H.S. ENGINEER
NOTE:
FROST SLEEVES TO BE INSTALLED ON WI. & MI. SITES ONLY.
SECTION 02920
TOPSOILING, SEEDING, FERTILIZING, AND MULCHING

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes topsoiling, seeding, fertilizing, and mulching areas disturbed by construction activities.

1.02 RELATED WORK (as applicable)

A. Section 02310 – Grading
B. Section 02370 – Temporary Erosion and Sediment Control

1.03 REFERENCES

A. Wisconsin Department of Transportation – Standard Specifications for Road and Bridge Construction.

1.04 SUBMITTALS

A. Topsoil
B. Seed Mixture and Application Rate Data
C. Mulching Material

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Natural loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils adapted to the sustenance of plant life.

B. Neither excessively acid nor excessively alkaline.

2.02 FERTILIZER

A. Use a 20-10-10 mixture of 20% Nitrogen, 10% Phosphorous, and 10% Pot Ash.

2.03 SEED MIXTURE

A. Use Wisconsin DOT seed mixture #20 or other Engineer accepted seed mixture for well drained sandy soils:

Wisconsin DOT Seed Mixture #20
6% Kentucky Bluegrass
24% Hard Fescue or Chewings Fescue
40% Tall Fescue
30% Perennial Ryegrass

B. Use Wisconsin DOT seed mixture #10 or other Engineer accepted seed mixture for average loam, heavy clay or predominately moist soils:

Wisconsin DOT Seed Mixture #10
40% Kentucky Bluegrass
25% Creeping Red Fescue
5% Redtop
20% Perennial Ryegrass

2.04 MULCHING MATERIAL

A. Straw or hay

PART 3 - EXECUTION

3.01 TOPSOIL

A. After grading is completed, spread stockpiled topsoil over all disturbed areas, excluding those where another type of finished surface is being provided.

3.02 FERTILIZING

A. Work soil to be seeded until soil is reasonably even and loose.

B. Fertilize all topsoiled areas using 20-10-10 fertilizer at an application rate of 400-600 pounds per acre.

3.03 SEEDING

A. Sow seed using either equipment suited to that purpose or scatter seed uniformly over area with hand seeders when the weather is sufficiently quiet to prevent seeds from blowing away.

B. Sow seeds at 150% of the manufacturer recommended rate.

1. Wisconsin DOT mix #20: minimum rate of 5 pounds per 1000 square feet area.

2. Wisconsin DOT mix #10: minimum rate of 3 pounds per 1000 square feet area.
C. Lightly rake soil to cover the seed with approximately ¼ inch of soil.

3.04 MULCHING

A. Place hay or straw mulching on seeded area loose enough to allow some sunlight to penetrate and air to circulate but thick enough to shade the ground, conserve soil moisture, and prevent/reduce erosion.

B. Do not perform mulching activities during periods of excessively high winds, which would preclude the proper placing of the mulch.

C. Apply straw or hay uniformly over the disturbed area to a loose depth of ½ to 1½ inches using 1½ to 3 tons of mulch per acre.

D. Immediately after spreading, anchor mulch using a mulch tiller consisting of a series of dull flat discs with notched edges or other approved equipment.

E. Anchor mulch to a depth of approximately 1½ to 2½ inches in the soil.

3.05 QUALITY CONTROL

A. All work necessary for topsoiling, fertilizing, seeding and mulching shall be completed to insure adequate re-establishment of vegetation.

B. The Contractor is responsible for re-establishing vegetation.

END OF SECTION